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EXTRACTUM COLOCYNTHIDIS COMPOSITUM.

By Edward R. Squibb, M. D., U. S. Navy.

Assistant Director Naval Laboratory.

"Take of Colocynth, deprived of seeds and sliced, six ounces.

Aloes in powder, - - -	twelve ounces.
Scammony in powder, - -	four ounces.
Cardamom seed in powder, -	one ounce.
Soap, - - - - -	three ounces.
Diluted alcohol, - - -	one gallon.

Macerate the colocynth in the diluted alcohol, with a gentle heat, for four days. Express and filter the liquor, and add to it the aloes, scammony and soap; then evaporate to the proper consistence, and, near the end of the process, mix the cardamom with the other ingredients."—U. S. Pharm.

Judging from the inefficiency of this important preparation, as it is frequently found, there are some points in its manufacture that do not meet with the requisite attention on the part of those who make and use it.

In the first place, apart from the quality of the other materials, there are two chief elements of uncertainty in the preparation, namely, the state of maturity and dryness of the colocynth used, and the amount of water in the soap. Colocynth not well matured, with white flattened seed that float in the menstruum, yields less extract; and soap, as usually found, varies in the amount of moisture from 10 to 19 per cent. In the second place, it is almost impossible, and quite impracticable, to separate all the seed from the colocynth as usually met with in the market;

because so many of the apples are immature or blighted that the seed in drying shrivel up to mere scales, and become impacted in the pulp, or broken up with it so as to escape ordinary precaution in the separation. The proportion of perfectly matured apples, with clean, deep olive grey heavy seed, does not amount to more than one-half, whilst those apples in which a portion of the seed is not easily separable, amount to about 5 to 8 per cent. in the best specimens of the commercial drug.

The best way to overcome these practical difficulties is, to establish experimentally a ratio for the pulp and seed by the amount of dry extract yielded, and the amount required by the formula, and then operate with seed and pulp together. This ratio needs to be corrected or newly obtained each time of making the extract, because in keeping, the seeds continue to lose weight long after the pulp becomes dry. Thus, entire apples, of the various sizes, selected with care, after having been kept three years in a dry store-room, yield 34 per cent. of pulp. Whilst a similar assortment of entire apples from the various parts of a recently purchased case yield 25·8 per cent of pulp. The pulp from such perfect apples, well exhausted, yield 60·7 to 60·8 per cent. of dry extract; whilst of the same selections, taken pulp and seed together, and treated in the same manner, the yield will vary widely according to the state of dryness, from 15·69 per cent. in the recent purchase, to 20·6 per cent. in that long kept.

The yield of extract from a careful average of the above mentioned newly purchased case, taken seed and pulp together, on the large scale, is only 14.112 per cent., whilst that from whole apples, seed and pulp together, is 15·69 per cent., showing that the average yield of pulp in a case is not that of the entire apples, but below it; that is to say, not 25·8 per cent. but 23·227 per cent. of the whole weight. Hence the mercantile assertion that broken colocynth is better than whole, because the seed being heavier and more mobile shake out and are lost in larger proportion, is not supported by fact, since whole apples yield nearly 1·6 per cent. more of extract than broken and whole together.

The writer has not been able to find a statement of the proper composition of this extract, and therefore has prepared the following, which is strictly that of the U. S. P., except that the

prescribed proportion of pulp is more fully exhausted than by the prescribed management.

Extract of colocynth, dry,	15·7 per cent.		14·48 per cent.
Aloes, - - -	51·7 "		47·68 "
Scammony, - - -	17·2 "		15·86 "
Cardamom, - - -	4·3 "		3·98 "
Soap, dry, - - -	11·1 "		10·24 "
		Water,	7·76 "
Dry comp. extract,	100·0		
Compound extract, pill mass consistence,			100·00

The formula and process arrived at by the writer as perhaps accomplishing the intention of the U. S. P., and as certainly yielding an excellent preparation, is as follows, the quantities being sixteen times those of the officinal formula.

Of colocynth, pulp and seed together, 28lbs. 5 oz. av., equivalent to 96℥ troy of pulp.

This should yield of dry extract	4lb av.=	58℥ 2½ʒ troy.
Aloes in powder,	13lbs 2¼ oz.=	192℥
Scammony in powder,	4lbs 6¼ oz.	64
Cardamom 1lb 9 oz. in husks,		
Yielding of powdered seed,	1lb 1¼ oz.=	16℥
Soap, (containing about 14 per cent. water,)	3lbs 4½ oz.=	48℥
Yielding when dried and powd.	2lbs 13¼ oz.=	41¼ʒ
Alcohol,		1 pint.
Diluted alcohol,		16 gals.

The colocynth, broken up with the hands, is macerated with 9 gallons of the Diluted alcohol for four days, at a gentle heat, with occasional stirring, in a vessel of 15 gallons capacity. The liquor* is then expressed and filtered through flannel into a vessel of 16 gallons capacity. The press cake or residue is then broken up and packed for percolation in a 10 gallon jar, around a glass tube. This glass tube is of an inch or more internal diameter, and of the length of the inside of the jar. Its lower end is made irregular and tied under with a piece of coarse

* This tincture yields 11·052 per cent. of dry extract, and therefore appears to indicate that the once expressing directed in the officinal process, (even though a much larger proportion of menstruum is used there,) is not sufficient to exhaust the material properly.

flannel, and the tube is then set upright in the centre of the jar so as to form a well for the percolate. Thus disposed three gallons of the Diluted alcohol is poured upon this residue, the jar covered, and allowed to stand in a warm place two or three days. It is then percolated with the remainder of the Diluted alcohol, the percolate being drawn from the central well by means of a very small India rubber tube syphon. The liquor is then finally expressed, and with the percolate strained into the receiving vessel* with the first portion, the whole well stirred together and allowed to stand two days. The clear tincture is then drawn off with a syphon, and carefully measured into a still, leaving the muddy portion, amounting to about 4 pints, in the vessel. This muddy portion is collected and boiled with the pint of Alcohol, cooled, and strained through flannel. If the attempt is made to filter this without some such treatment as this boiling with alcohol, a very imperfect result will be obtained, and much time lost, for the tincture will evaporate faster than it will pass the clogged filter. Even by this method about 3 hours is required to get off the clear tincture. The whole tincture having been carefully measured, one fourteenth part is separated, and evaporated to dryness in a tared basin. The weight of this dry extract multiplied by fourteen gives the weight of the whole yield. If the yield thus indicated be over four pounds avoirdupois, as will commonly be the case, the surplus is taken from this dry extract and put aside for a future operation. The remainder, or amount necessary to make the proper proportion in the compound extract, is added with the aloes.

About 8 gallons of dilute alcohol is then recovered from the tincture by means of a water or steam bath, and this is reserved for a future process. The residuary liquor in the still is then transferred to a tared evaporating basin and evaporated over a steam jet to the consistence of honey. The powdered aloes is then added and the mixture stirred till the heat has melted the aloes. The soap, previously dried and powdered, is next added and thoroughly incorporated. Then the scammony,—and finally the cardamom powder is added, and the whole stirred well for

* This second tincture yields on evaporation 3·06 per cent. of dry extract, similar in all its sensible properties to that from the first tincture.

about half an hour, and weighed. If the contents of the basin weigh more than 27½ lbs. av., the evaporation and stirring are resumed till that weight is attained.

This preparation, when quite cold, is of a good consistence for pills, is of a dark olive brown color,—not black,—and has a fine aromatic odor.

To adapt it to more general use, and for convenience of dispensing, it is the practice of this laboratory to dry the extract further, or until it can be rubbed up to a coarse powder, and served in bottles. The further drying is effected by spreading it upon the large glass plates of the drying room for about 3 days, when it is found to weigh about 25½ lbs. av., or very nearly the sum of the weights of the dry materials.

In this process, although the long heating and stirring rendered necessary by the U. S. P. direction to add the powders at the beginning of the evaporation is avoided, yet the aroma of the aloes is driven off in so great a degree as to pervade the house clothing, &c., for some days,—while the process is still laborious and troublesome, involving much skill and good management in securing a good aromatic preparation.

When made from good Bonair gourd aloes, and scammony containing 60 to 67 per cent. of resin, this preparation costs about three dollars per pound, exclusive of the labor and skill of manufacturing, or, say three dollars and a half as the lowest entire net cost of manufacture on a scale of 25 lbs,—and yet it is confidently believed that some hundreds of pounds have been supplied to the New York market during last year at prices varying from seventy-five cents to one dollar per pound,—and that the preparation sells the better, and the more largely, as the price is lower.

In view of these circumstances, and for other reasons, the writer proposes another method for this formula, by which the same ratio of materials are combined, and an extract of full aromatic and purgative value is very easily and expeditiously prepared, in a form applicable to all uses, and constant in its composition, when the intent is good.

This is simply that the materials be mixed in the dry state, and powdered and sifted together. The soap, an important corrigent and adjuvant to the aloes and scammony, is very easily

dried and powdered; and, like the cardamom, is more easily and efficiently powdered in association with the other materials. The admixture also facilitates the pulverization of the aloes, by rendering it less liable to gum or clog.

Such an extract has been prepared, and is now being tested in practice, with a view to its substitution for use in the Navy. The formula used is as follows:

Extract of colocynth dry	10½
Aloes	34½
Scammony	11½
Cardamom	3 ʒ
Soap, dried at 212°	7½

The ingredients are mixed together thoroughly, and then powdered and sifted through bolting cloth of 110 threads to the linear inch. Portions of the cardamom seeds and the ligneous impurities of the aloes and scammony pass through the sieve last. Therefore a second mixing and sifting is required to ensure equability in the resulting powder.

A very small proportion of water,—7 to 8 per cent.—makes this powder at once into the consistence for pills.

It would be an improvement upon this, and all formulæ for this preparation if resin of scammony could be substituted for the drug, since the drug varies as much, even under the present law for inspection, as from 55 to 80 per cent. in medicinal value.

U. S. Naval Laboratory, New York, Jan., 1857.

ON AQUEOUS FLUID EXTRACT OF SENNA.

William Procter, Jr.

Dear Sir:—Having been extensively engaged in manufacturing Fluid Extract of Senna during the past few years, my experience has led me to adopt a method differing from that prescribed in the Dispensatory. Its advantages consist in this, that the resulting extract is a handsomer preparation, less liable to fermentation, affords a clear mixture with syrup and infusion, and, above all, free from griping property. It has

been extensively used, and I think its value is proved. I send the formula for publication, if you think it of sufficient value.

Take of	Senna, bruised	2½ lbs.
	Sugar	℥vij.
	Ol. Fennel	
	Ol. Carui	*aa* gtt. xv.
	Alcohol	℥vj.

Macerate the senna in cold water. Transfer to a percolater and displace with the same so long as the infusion shows strength. In warm weather place ice on the percolator. Add the sugar and evaporate to 26 ounces. Then add the alcohol holding the oils in solution. Mix well, allow the precipitate to subside, and decant the clear liquid for use.

Fluid Extract of Senna as thus prepared, is a more fluid preparation than the officinal extract, is not unpleasant to the taste, is quite active in a dose of one to three teaspoonfuls, and operates with little or no pain to the patient.

Very truly your ob't serv't,

HENRY THAYER, M. D.

Cambridge, Mass., Jan. 28, 1857.

NOTE ON BARKS.

By EDWARD PARRISH.

Melambo or Matias Bark.

In confirmation of the conclusions of E. S. Wayne, in his paper in the last number of this journal, I may state that I have recently enjoyed an opportunity of comparing specimens of the bark such as I presented to him, and which he has so thoroughly examined, with samples in the cabinet in the University of Pennsylvania, known as Melambo Bark. These have been in the Cabinets of Drs. Wood and Carson for years, and correspond precisely with the bark alluded to. This bark has been, for a year or two past, quite abundant. It was invoiced to the importers as Matias bark; and large quantities have been sold to spice grinders for the purpose of adulteration, and to the trade generully, as Winter's bark. It is one of the most delightful aromatics I have ever met with, and apart from any febrifuge properties, is rendered valuable by its stimulating and agreeable aroma.

Soap Bark.

The *Quillaia Saponaria*, or Soap Bark, has been occasionally imported into this country for twenty-five years past. Dr. Ruschenberger mentions having become acquainted with it in Chili in 1827, when it was reputed to be highly medicinal, though chiefly used for its soap-like qualities in cleansing cloth from stains and grease, and as a hair-wash.

In vol. xii, p. 209, of this Journal, a chemical analysis of this bark by MM. Henry, Jr. and Boutron Charland, is published. This shows it to contain *Saponin*, which is its most characteristic principle, and no tannic acid or bitter principle.

Although not very generally known, Quillaia has considerable reputation, and would be still more popular if always obtainable. Having occasion to procure some a few months since, I applied to several drug houses without success, till at last I met with some, as I supposed; and having procured a quantity, without much examination, added it to a preparation I was making, to which, I soon discovered, it imparted an intensely bitter taste. After detecting the sophistication in this way. I proceeded to examine the bark, and found it to differ from Soap Bark, and though apparently a quassia, to be different from any Simaruba at hand. It has sufficient interest to demand further investigation.

Quassia Bark?

Is quite cheap, and I suspect is obtainable in large quantities. It comes in flat pieces, sometimes two feet in length, six inches in width, and a quarter of an inch in thickness, and apparently from the trunk of a very large tree. Externally it has a layer of thin, rough, dark grey epidermis not easily separable; internally it is nearly white, very soft and glossy; its texture is fibrous, though not as distinctly so as in the case of the Simaruba bark I have heretofore seen. Its taste is intensely bitter, without astringency or acridity. It has no odor. The existence of a distinct, easily separated, dark colored outer bark, and less fibrous and stringy structure, serve to distinguish this from Simaruba, which is from the root, while this is evidently from the trunk. May not this be the bark of the Quassia Excelsa?

Its substitution for *Soap bark* may instantly be detected by

the taste; nor do they resemble each other very closely if compared. Soap bark is more fibrous; the inner surface is seldom so white, it has, in fact, when old, a decided brownish tinge; the outer bark is much thicker and rougher and has a reddish brown color, not grey. Another remarkable characteristic of Soap bark is the appearance of minute, glistening crystals, which cover the whole fibrous structure, and are seen when it is fractured. Its acrid taste, and the frothing of its infusion, are highly characteristic.

NOTE ON COLLODION.

By William Procter, Jr.

Notwithstanding so much has been written on the subject of collodion, and it has become an officinal preparation, many continue to find difficulty in obtaining a gun cotton that will dissolve readily and produce each time a uniform preparation of equable consistency. Usually the Pharmacopœia process, strictly followed, affords a cotton of which the greater part is taken up by alcoholic ether, leaving an undissolved residue which needs to be strained out. Sometimes it happens that the cotton loses its fibrous texture and coalesces into a gummy mass, appearing like tragacanth mucilage, which does not properly dissolve. Again it will be like quince mucilage in consistence, whilst frequently a perfect solution is obtained. The action of nitric acid on cotton is now well understood to be the substitution of nitrous acid for hydrogen, or perhaps nitric acid for water in the formula of cotton. Soluble cotton is considered to be less nitricised than the true gun-cotton, the formula of which, according to Porret and Teschemacher (Gregory's Chemistry, fourth edition), is $C^{12}\ H^{8}\ O^{8} + 4NO^{5}$ or $C^{12}\ H^{8}\ O^{12}\ 4NO^{4}$. Acording to this formula two equivalents of water are replaced by two eq. of NO^{5}, and then two other eqs. of NO^{5} are taken into the composition of the gun-cotton: so that the anhydrous cotton is to the nitric acid as 144 to 216. Other chemists have given the formula for gun-cotton with a less proportion of nitric or of nitrous acid. The soluble cotton has been stated to contain 3 equivalents of NO^{5} to 2 equivalents of anhydrous cotton $C^{24}\ H^{17}\ O^{17}$, $3NO^{4}$ (Gladston in Pharm. Jour. xi., 481). Be this as it may,

it is quite evident that the physical property of the resulting compound, as regards solubility in alcoholic ether, is exceedingly variable and it would be interesting to know whether these degrees of solubility are parallel with the proportion of NO^5 absorbed into the constitution of the cotton. When fully nitricised, 100 parts became 169.5 parts of gun-cotton fit for blasting. In my experience with the Pharmacopœia process 100 parts became usually 125 parts. Last autumn, when illustrating this subject to the class, cotton was immersed in equal parts of commercial sulphuric acid and red fuming nitric acid sp. gr. 1.45 and then set aside until the next lecture, an interval of four days elapsing, when it was removed, washed, pressed, washed in alcohol, again pressed, and was found to be completely soluble in alcoholic ether without residue. Since then I have repeatedly tried the process with the long maceration and have uniformly succeeded in obtaining a soluble cotton, and now offer the following formula based on this experience.

Take of Fuming nitric acid, (sp. gr. 1.42 to 145)	
Sulphuric acid, of each	four fluid ounces.
Cotton, free from impurities	half an ounce.
Commercial ether	two and a half pints.
Alcohol and water, of each	a sufficient quantity.

Mix the acids in a suitable vessel capable of being covered; introduce the cotton, and after pressing it into the acid until perfectly immersed and saturated, allow it to stand four days. The cotton should then be removed, the excess of acid pressed out, and then thoroughly washed till it is neutral to litmus paper. It should now be strongly pressed between bibulous paper, then immersed in strong alcohol to abstract the adherent water, and again pressed, when it may, without further drying, be put in the ether and dissolved. The use of alcohol for drying gun-cotton is an improvement attributed to the late W. W. D. Livermore of Philadelphia.

The collodion by this process is less mucilaginous than that obtained by the U. S. P. formula, but it is very adhesive and dries rapidly. There is no necessity of teasing the cotton about in the acid mixture with glass rods, when so much time is afforded for the maceration, and hence the fibres of the cotton are less interwoven and can be separated readily when picked out previous to drying, when it is desired to get it in that state.

ON SOLUTION OF SULPHITE OF SODA.

PROF. PROCTER :—

About a month since I received the following prescription, the second I had seen of the kind, and which I think has frequently been presented at the counters of pharmaceutists in this city :—

Solut. Sulphite of Soda ℥vj.

S. J.

Take two teaspoonfuls for a dose.

Knowing of no formula for such a preparation, I applied in vain to several apothecaries, and to the physician himself, to know what proportion of the salt indicated was to be dissolved in a given quantity of water.

Finding that the secret was possessed by one pharmaceutist only, I was compelled to purchase the solution of him, and having taken the trouble to ascertain its composition, I thought it well to communicate the result in this way ; so that if deemed best it may be made public through the columns of the Journal, for the benefit of those who, like myself, have been at loss about it.

One fluid ounce of the solution being evaporated nearly to dryness, solidified into a crystalline mass which weighed 30 grains. On examination the salt possessed the properties of hyposulphite of soda ; it was odorless, of a mild saline, "hepatic" taste. Heated in a test tube it fused and then decomposed, giving off sulphur, which was sublimed into the upper part of the tube. The solution was neutral to test paper. The hyposulphite is slightly alkaline unless an excess of acid is present. Nitrate of silver caused a white precipitate soluble in excess of the hyposulphite. This precipitate gradually acquired a brown, and afterwards a black color, owing to the formation of sulphuret of silver. Freshly precipitated chloride of silver was also entirely soluble in the solution.

This salt is much used in the Dageurreotype art to wash off the superfluous iodine from the plate. Many years ago it was highly recommended as an antiherpetic, and used as a remedy in exanthematous affections, painful affections of the skin, slight congestions of the viscera, scrofula, lymphatic diseases, &c. A formula for a syrup of the hyposulphite containing one part of the salt in 30, was published in the Journal, Vol. xvii.

PHARMACEUTICAL NOTICES.

By the Editor.

From time to time, in the experience of a regular pharmaceutical establishment furnished to meet the ordinary demands of the medical profession, there are substances or preparations called for which are not in store, and have either to be procured or made. It is well when the pharmaceutist can fabricate them from his stock, and he often may, by practical familiarity with the principles involved in pharmaceutical manufacturing. For instance a fluid extract of a substance is prescribed, of which a solid extract is in the store. By knowing the relation which this extract bears to the substance yielding it, the apothecary may convert such extract into fluid extract by the proper menstruum and preservative agent. We give below formulæ for several preparations, which have been recently prescribed in this city.

Extractum Jalapæ Fluidum.

In making a formula for this preparation it is necessary to use a menstruum that will dissolve the resin upon which its activity is to depend, and the liquid which is to remain in the preparation, should possess the same solvent powers. Moreover, in reference to strength, it is best to take that of the fluid extract of rhubarb and of senna as the type—ounce to the fluid ounce. Hence it must be at least partially an alcoholic fluid extract, and not a saccharine one, as in the case of rhubarb. The following is the formulæ; viz:—

Take of Jalap, of good quality, sixteen ounces (Troy.)
Sugar eight ounces.
Carbonate of Potassa half an ounce.
Alcohol,
Water, of each a sufficient quantity.

Reduce the Jalap to coarse powder, pour on it one pint of a mixture of two parts of alcohol and one water, and allow it to stand twenty-four hours. Then introduce it into a percolator and pour ordinary diluted alcohol slowly on until half a gallon of liquid has passed. Evaporate this in a water bath, or still, till reduced to one half, then add the sugar and carbonate of

potassa, and evaporate till reduced to twelve fluid ounces. Put the liquid thus obtained, which yet warm, in a pint bottle, and add four fluid ounces of alcohol, and mix by agitation.

The alkali forms a resinous soap with the jalap resin, greatly increasing its solubility in water, and at the same time renders the preparation less griping. (See Durand in vol. iii. page 87 of this Journal, 1831.)

The object of the sugar is also to aid in the retention of the resinous matter in a fluid condition, as well as to mask the taste of the Jalap. The dose will vary from fifteen minims to a fluid drachm according to the effect desired. By means of this preparation the physician may prescribe Jalap in mixtures with great facility, and avoid the large proportion of alcohol unavoidable when he resorts to the officinal tincture.

Tinctura Ignatiæ Amaræ.

Since the extract of the Bean of St. Ignatius has come into use through the agency of a recipe advertised by a certain individual of Brooklyn, N. Y., some of our physicians have employed the extract, and if we are correctly informed, observed effects from it not entirely attributable to the strychnia it contains. We published a formula for the extract in vol. iii. 3d series, page 227 (1855.)

Since then a tincture has been prescribed, and as we are not aware of a formula for its preparation having been published, the following is given as embracing the strength intended by the prescriber. The proportions are those of the officinal tincture of nux vomica, but the strychnia strength of the preparation is greater and the dose consequently less.

Take of Beans of St. Ignatius, four ounces troy.

Alcohol,

Water, of each a sufficient quantity.

Reduce the beans to coarse powder by mill or pestle (which is an operation involving labor,) moisten the powder with two fluid ounces of water and in any suitable bottle, cork it and heat by a water bath until the powder is swollen, then pour on half a pint of alcohol and digest for three hours by the same means, when the contents of the bottle may be thrown on a percolator and slowly displaced with alcohol until a pint of tincture is obtained.

The tincture by this process may be well made in a short time, but if made by maceration, in alcohol only, at least two or three weeks should be allowed, owing to the horny, close texture of the beans, the bassorin in which resists the action of the solvent on the enclosed strychnia and brucia salts. The dose of this tincture prescribed was ten drops three times a day.

Tincture of St. Ignatius's Bean may be made extemporaneously from the alcoholic extract, using half an ounce of extract to the pint of alcohol, or fifteen grains to the fluid ounce. The quantity of extract is based on the assumption that it is of average strength. When however it is purely alcoholic, three drachms is sufficient, and if hydro-alcoholic it may require five drachms. Owing to the variable quality of the extract in the shops it is safer to make the tincture at once from the beans, unless the actual strength of the extract is known.

Liquor Acidi Sulphurosi.

Aqueous solution of sulphurous acid has been repeatedly prescribed in this city, and although a *saturated* solution is called for, in practice such a preparation is not eligible as the natural variations in temperature cause the escape of gas. The following proportions and arrangement we have resorted to in making the solution:

Take of Copper turnings,	- -	four ounces.
Sulphuric acid,	- -	eight fluid ounces.

Put the copper in a tall flask of the capacity of three pints, and pour in the acid, set the flask securely in a shallow sand bath over a gas burner, and by means of bent tubes and corks connect the flask, first with an empty half pint bottle, and this with a bottle containing four pints of clear water, the tube passing down in the water nearly to the bottom. The joints should be carefully made and luted, and the bottle of water to be charged should be set in a vessel of cold water. Heat should then be applied to the sand bath until effervescence commences, and then carefully regulated so as to prevent the black froth from passing over into the first vessel. As soon as the gas ceases to come over, remove the bottle of solution before the lamp is extinguished and put the solution in pint or half pint bottles, (according to the quantity usually prescribed,) nearly filled, and cork and seal them.

Extractum Anthemidis Fluidum.

At the request of a medical friend, who has a high opinion of the antiperiodic power of Chamomile in certain cases of obstinate ague, we prepared a concentrated solution of the flowers preserved by sugar and alcohol, of the strength of thirty grains to the teaspoonful, by the following recipe:—

Take of Chamomile flowers,	eight ounces (troy.)
Sugar, - -	eight ounces.
Alcohol,	
Diluted alcohol, of each	a sufficient quantity.

Bruise the chamomile thoroughly, pour on it a pint of alcohol and macerate for twenty-four hours, pack it moderately tight in a percolator, and pour on slowly diluted alcohol, until a pint of liquid has passed; then change the recipient, and continue the process until two pints more of tincture are obtained. Evaporate the first tincture by a gentle heat, or spontaneously to six fluid ounces, and the other in a water bath to four fluid ounces, mix the liquids, add the sugar to them, dissolve by a gentle heat, and finally add alcohol until the whole measures a pint.

The dose of this preparation is from one to two teaspoonfuls as an antiperiodic, or half a teaspoonful as a tonic.

CONTRIBUTIONS TO TOXICOLOGY.

Translated from Wittstein's Vierteljahreschrift by J. M. Maisch.

Poisoning by Helvella esculenta.

Dr. E. Hamburger, of Bromberg, describes a case of poisoning by Helvella esculenta, (common morell,) which occurred to a forest inspector, his wife and six children. The first symptoms, observed on the day following the partaking of the morells, were headache, nausea, vomiting, with pains in the belly; the sick took milk as an antidote, which proved unavailing, and 24 hours after the poisoning a physician was called, who ordered castor oil, oily clysters and cold fomentations to the head. On the next day Dr. H. was called, who found the three youngest children dead, the three others, between 10 and 15 years, suffering with the following symptoms: Somnolency, but not difficult to

wake, and then clear consciousness; eyes deeply sunk; face dark red, which turned pale as soon as the vomiting of green masses mixed with blood commenced; belly inflated, and very tender and painful; pulse quick, hard and short, changeable; skin hot, extremities cool; tongue dry, but no drink was asked for; stools slimy, with bloody stripes, but painless.

Dr. H. commenced the antiphlogistic treatment, internally purgatives with ether and ammonia, on account of the loss of strength, and with opium and valerian to the girls, on account of their convulsions. The next day all the symptoms were milder; prescribed an emulsion of oil; the youngest girl still suffered from drowsiness and vomiting; treatment with cold fomentations, oil clysters and sinapisms was continued. On the 18th day all had recovered. Exanthemata, as described by Niemann, swelling of the tongue or head, was not observed.

These fungi, according to all botanists and pharmacologists, are classed with the innocent and eatable ones, and have always been eaten without any bad consequences. The present case, however, seems to indicate that all fungi, under certain conditions, even the most innocent ones, are capable of furnishing the characteristic fungus-poison; but these conditions are yet unknown.—*Deutsche Klinik*, 1865; *Dr. Wachtel's Zeitschr.*, 1855.

Poisoning of Chickens. By X. LANDERER.

The author was judicially invested with the chemical examination of poisoned chickens, which he found were killed by orpiment, the yellow sulphuret of arsenic. Not a trace of the poison was found in the stomach and entrails; it had all remained in the crop, from which place, consequently, it had developed its deadly power.—*Wittstein's Viertelj.* v., 352.

NEW PROCESS FOR THE PREPARATION OF FERROCYANIDE OF POTASSIUM.

By RICHARD BRUNNQUELL.

This process depends on the conversion of ammonia into cyanide of ammonium by ignition with charcoal or carbonaceous matters; and its principal peculiarity consists in the conversion

of the cyanide of ammonium thus produced into cyanide of potassium, representing ferrocyanide of potassium, in the humid way. The gas containing ammonia is therefore passed through tubes filled with charcoal and heated to redness; the ammonia is thus converted into cyanide of ammonium, and this into ferrocyanide of potassium by contact with aqueous solution of potash and suitable iron compounds. The particular advantages of this method are the following:—

1. *The considerable loss of potash and the expense of its recovery are got rid of.*—The potashes are first dissolved in water, by which they are freed from the greater part of the foreign salts. The solution is then treated with a quantity of the cyanide sufficient to convert the greater part of it into ferrocyanide of potassium; this is allowed to crystallize, and the mother-liquor employed without further preparation for the same purpose. Thus we get rid at once of the contamination with silica, &c., and of the necessity of bringing the dissolved potashes again into a solid form, which is of itself a cause of loss.

2. *It becomes possible to replace the potashes by soda, which is much cheaper.*—By the old processes this was often tried in vain, because from the difficult reduction of sodium, the formation of cyanide of sodium in the dry way does not take place so easily, and moreover ferrocyanide of sodium cannot easily be crystallized from such impure solutions as the mother-liquors. The first difficulty is entirely got rid of in its formation in the humid way, and the second may also be overcome, as the solutions are much purer. Ferrocyanide of sodium certainly does not form such beautiful crystals as ferrocyanide of potassium; but if it can be prepared more cheaply, it will certainly make its way into use, especially as 6 parts of it go as far as 7 of ferrocyanide of potassium, the equivalent of sodium being lower.

3. *Bones may be employed in this process*, their subsidiary product, bone charcoal, covering the cost of the bones and their carbonization, and they would, therefore, furnish the nitrogenous gases for nothing. The gases from the carbonization of bones, are just as rich in ammonia in proportion as those of most other raw materials; in proportion to their weight, however, bones furnish less ammonia and much less gas.

4. *It is possible to bring back into the manufacture that portion*

of the ammonia which escapes conversion into cyanogen, and thus convert it also into cyanogen; the ammoniacal salts obtained as subsidiary products, may be converted into ferrocyanide of potassium, by mixing them with lime, and adding them to the raw material.—*Jour. Frank. Inst., Feb.* 1857, *and Chem. Gaz.*

THE SASSY TREE OF WESTERN AFRICA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

My dear Sir:—In the interesting paper, by Mr. Procter, on the Sassy tree of West Africa, which is reprinted in the *Pharmaceutical Journal*, xvi., 233, there is an error which I venture to ask you to allow me to correct, there being no evil in Modern Natural History so great as the excessive multiplication of names.

Mr. Procter says, that "as no specific name has been given to this tree," he calls it Erythrophleum judiciale. It happens, however, that it had already two specific names, as will be seen upon reference to Hooker's *Niger Flora*, an important systematical work, which all should study who write on the plants of the Gold Coast and neighboring regions. At p. 329 of the *Niger Flora*, Mr. Procter will find the following sentence: "1. Erythrophleum Guineense G. *Don. Gard. Dict.* 2, p. 424. Fillœa sauveolius, *Guill. et Perr. Fl. Seneg.* 1, *p.* 252, t. 55."

I am able to state, from an inspection of Mr. Procter's specimens, with a sight of which you have favored me, that his plant is identical with *Erythrophlœum Guineense*, as, indeed, he will see if he turns to Guillemin and Perrottet's very good figure of the plant. Therefore the name *judiciale* must be erased from works of science.

Yours faithfully,

Acton Green, Dec. 18, 1856. John Lindley.

[Note by the Editor.—The essay referred to in Prof. Lindley's note, was published nearly five years ago in this Journal. On the occasion of forwarding some specimens of American drugs, quite recently, to London, the opportunity was taken to send the specimens of Erythrophlœum, upon which that essay was based, with the request that they might be shown to some prominent botanist, with the view of corroborating or correcting the statements it contained, as the author had some doubts in reference to the propriety of naming the tree, in the absence of more extended references to recent authorities beyond his reach.]

ON A NEW CINCHONA BARK AND ITS ALKALOID, CINCHONIDINE.

By M. Wittstein.

The author has obtained from M. Geith, of the firm of Ammon and Geith, of Nuremberg, a new Cinchona bark, which was forwarded to him from Hamburg as *Cortex Chinæ rubiginosus*. Its mode of packing was exactly like that of the *C. Calisaya*. Of its origin nothing further could be ascertained than that the bark was obtained from London, and the name was only attached to it in Hamburg.

From an exact examination, and a determination effected by Prof. Mettenheimer of Giessen, it appeared to belong to the genus of barks known under the names of *Cinchona flava*, *Carthagena*, *aurantiaca*, and *C. flava fibroso*, which are not rich in alkali.

According to the investigation made of this bark by the author, it has much resemblance to the *Cinchona regia* or *Calisaya*, but differs greatly therefrom in its chemical composition. The author therefore calls it

Cinchona pseudo-regia.—It forms strong, smooth fragments, without epidermis, and with a fibrous fracture; its taste is bitter, and its color is between that of *C. regia* and *C. rubra*. In the cold extract of 20 grs. of bark,—

Tartrate of potash produces a gray turbidity;

Tannic acid, a gray precipitate;

Perchloride of iron, a greenish-yellow color with a slight turbidity;

Oxalate of ammonia, a slight white turbidity;

Ammonia, a reddish-gray turbidity; and

Acetate of lead, a whitish turbidity, from which a reddish-gray precipitate gradually settles.

This bark contains a new alkaloid, which the author calls

Cinchonidine, $C^{18}\ H^{10}\ NO$.—It crystallizes in colorless, shining needles and prisms, 1 to 2 lines in length, belonging to the oblique rhombic system. It is inodorous and bitter. The cold, saturated, alcoholic solution has a distinct alkaline reaction; the ethereal solution has a very weak alkaline reaction, and the aqueous solution produces no change on vegetable colors. The alcoholic solution tastes extremely bitter, almost like quassia;

the ethereal and aqueous solutions of course taste less bitter in proportion to their smaller amount of alkaloid. On platinum foil it fuses into a colorless liquid, which evolves fumes smelling not unpleasantly like oil of bitter almonds: at the same time it becomes brown, ignites, and burns with a smoky flame, without leaving a trace of residue. By trituration it furnishes a snow-white electrical powder. The alkaloid loses nothing in weight up to 212° F., and even to its melting-point of 336° to 338° F. Its solubility is as follows:—

1 part dissolves in 398 parts of ether of sp. gr. 0·740 at 61°–68° F.
1 ... 88 parts of alcohol of sp. gr. 0·833 at 61°–68° F.
1 ... 19 parts of alcohol of sp gr. 0·833 at boiling heat.
1 ... 3287 parts of water at 61°–68° F.
1 ... 596 parts of water at boiling heat.

The new alkaloid behaves as follows towards reagents:—

Freshly prepared chlorine-water dissolves it readily without color; liquid ammonia, gradually dropped into this solution, produces at first a light, flocculent, grayish-white precipitate, which floats upon the dingy yellow fluid, but disappears with the greatest facility by the addition of an excess of ammonia, whilst the fluid again appears clear-wine-yellow. Concentrated sulphuric acid dissolves it rapidly; the solution is colorless, and undergoes no perceptible alteration by being gently heated. Concentrated nitric acid and concentrated muriatic acid behave in the same way. It also dissolves with the greatest facility in dilute acids, and saturates them completely. The solution in muriatic acid was prepared by adding the powdered alkaloid to 1 oz. of hot water acidified by the addition of 5 drops of muriatic acid of spec. grav. 1·13 until the last portion did not disappear. It did not alter either litmus- or turmeric-paper, and behaved towards some reagents in the following manner:—

Caustic alkalies produced white, densely flocculent precipitates, which rapidly acquired a granular crystalline appearance. Alkaline carbonates behaved in the same way; these precipitates dissolved quietly in acids after washing, so that they were free from carbonic acid. Phosphate of soda also gave a white, densely flocculent precipitate, which quickly became granular crystalline. Perchloride of mercury gave a strong white turbidity, which remained finely flocculent. Perchloride of gold gave a yellow tur-

bidity, which rapidly caked together into pale citron-yellow flakes. Perchloride of platinum furnished a pale orange-yellow, finely flocculent precipitate, which underwent no further change. Protonitrate of palladium gave a pale orange-yellow, finely flocculent precipitate, which also remained its original nature, Sulphocyanide of potassium produced a white turbidity, which quickly united into a granular crystalline form, and adhered firmly on the walls of the vessel. Iodide of potassium the same, except that the transition to the granular crystalline form took place more slowly. Biniodide of potassium gave a strong brownish-yellow precipitate united into thick flakes. Tannic acid, a milk-white, finely flocculent precipitate, which underwent no further change in its appearance.

By distillation with potash, the alkaloid appears to furnish chinoline. Analysis :—

C	77·363	77·272	18 =	1350	77·143
H	7·185	7·296	10	125	7·143
N	9·896	..	1	175	10·000
O	..	..	1	100	5·714

The *platinochloride* is a pale orange-colored precipitate, tolerably hygroscopic. It contained 28·47 and 28·49 per cent. of platinum (calculated, 28·495). This alkaloid is homologous with cinchonine, $C^{20}\ H^{12}\ NO$, cinchonine—$C^2H^2 = C^{18}\ H^{10}\ NO$, cinchonidine.

In the investigation of the bark, &c., T. Crawford and H. Krombach took part. The following analysis of the ashes of the new bark was made by the latter chemist. The ashes consist for the most part of carbonate of lime.

1000 grs. of air-dried powdered bark lost 75 grs. by drying at 212° F. The remaining 925 grs. furnished 19·96 grs. of tolerably white ashes. The amount of ash in the air-dried bark therefore is 1·996 per cent., and in the bark dried at 212° F. 2·157 per cent. The composition of the ashes was—

Potash	5·32	Chlorine	2 23
Soda	5·82	Sulphuric acid	3·62
Lime	38·73	Phosphoric acid	3·31
Magnesia	0·50	Silica	6·33
Alumina	1·00	Carbonic acid	32·33
Oxide of iron	0·80		

Chem. Gaz., Jan. 15, 1857, *from Wittstein's Vierteljahr.*

ON THE PHYSIOLOGICAL AND MEDICINAL PROPERTIES OF CARBO-AZOTIC ACID.

By Grace-Calvert and Dr. J. M. Moffat.

It is only within the last few years that any attempt has been made to make use of the remarkable properties which this acid presents, discovered by M. Welter, and so well described by M. Chevreul in 1809.

One of us having been called upon, some years since, to seek a method of preparing carbo-azotic acid, which should be constant in its results, and at the same time not expensive, adopted after many trials the process recommended by Laurent, as being that which best fulfilled the required conditions; at the same time we have to state that great precaution is necessary to obtain carbo-azotic acid free from indigotic and oxalic acids.

The acid which we prepared is, as M. Chevreul has said, in small plates of a very pale yellow; it gives, even in dilute solutions, a precipitate with salts of potash.

The intense bitter of carbo-azotic acid suggested the idea that its employment in medicine might be useful; a certain quantity of this acid as well as of the carbo-azotates of ammonia, iron, nickel, and zinc, was placed in the hands of Dr. Moffatt, and soon it was perceived that the above-named compounds would have therapeutic properties of great value, for they had much analogy with those of quinine.

It was remarked that the carbo-azotates of ammonia and of iron succeeded the best, the free acid being apt to cause cramps in the stomach. Carbo-azotate of iron has perfectly succeeded in several cases of cephalalgia; carbo-azotate of ammonia in cases of anemia, intermittent fever, and hypochondria. This salt mixed with gallic acid and opium has several times cured obstinate diarrhœa. Dr. Moffat has himself obtained more than twenty-seven cases of different cures by means of the carbo-azotates. The dose of carbo-azotate, which has been administered in pills, has been from 0·05 to 0·10 gramme per day. We are at present examining what is the minimum dose which can act on the system. That which renders the employment of these compounds exceedingly interesting is, that the patients become yellow as if they had a severe attack of jaundice, and as in this

last disease, not only the skin but also the conjunctiva of the eyes is colored. The time necessary for this coloration seems to vary according to the patients, from two to sixteen days, but the mean has been seven days. The quantity of carbo-azotate which has generally produced the coloration of the skin has been about a gramme. It disappears in two or three days after this product has ceased to be administered.

We have sought to discover the presence of this acid in urines, and the following is the process which we have followed:—The urines were treated by acetate of lead, rendered slightly acid by some drops of acetic acid. The abundant white precipitate which is produced was removed by filtration, and the liquor evaporated perfectly to dryness in an oil bath kept at a gentle heat. The residue treated by ether gave an ethereal extract, which, evaporated to dryness, left a slight residue, which residue dissolved in distilled water, was divided in two parts, A and B. In A, was put boiled silk, which remained white as long as the patient was not colored, but it was otherwise during the whole time of the artificial jaundice. The depth of coloration that the silk takes augments with the quantity of carbo-azotate administered. The portion B was mixed with alcohol and ammonia, and then a current of sulphuretted hydrogen was passed through it for half-an-hour. When carbo-azotic acid was present the solution became red by the formation of picramic acid, discovered by M. Gérard. By these means we have been able to detect 0·01 of carbo-azotic acid in 100 grammes of urine, even when it has been kept several days.

This coloration of the skin appears to us so important in a physiological point of view, that we are actively pursuing our researches not only on man but on animals. If Braconnot, who employed carbo-azotate of potash, did not obtain similar results, it was probably due to the insolubility of the salt employed, or that he did not use true carbo-azotate of potash.—*Chemist, Sept.* 1856.

ALUMINIUM—THE PROGRESS IN ITS MANUFACTURE.

By W J. Taylor.

[From the Proceedings of the Academy of Natural Sciences of Philada., Jannary, 1857.]

The use of sodium in the reduction of metals from their chlorides, as has been so successfully accomplished within the last two years, may be justly considered a great progressive step in science.

Aluminium has been the first in which this process has been perfected. What the other metals are which will be reduced successfully from their chlorides by the use of sodium, the future will determine. Some facts concerning the early history of aluminium, the progress made in its manufacture, and the numerous uses to which it can be applied, will not be uninteresting.

Much confusion existed in the minds of the early alchymists regarding the oxide alumina. They knew of an alum which was brought from the East, which they regarded for a long time as sulphuric acid combined with an earth. Stahl and others also mistook this earth for lime. Geoffroy, in 1728, pointed out its existence in clay; Marggraff, in 1754, proved it to be a substance having a separate existence and peculiar characters. To Oerstedt belongs the credit of first preparing the chloride of aluminium, from which compound Wöhler, in 1827, succeeded in first eliminating the metal. Wöhler first obtained aluminium in the form of a grey powder, by heating gradually in a porcelain crucible over a spirit lamp equal volumes of metallic potassium and chloride of aluminium; other chemists, by slight modifications of this process, have obtained aluminium in the form of the grey powder, as first obtained by Wöhler.

To M. Sainte Claire Deville belongs the credit for first improving the process, so as to produce aluminium in such quantities that its characters as a metal could be fully investigated. M. Ste. Claire Deville used in his process sodium as a substitute for potassium. (It requires 39 parts of potassium to produce the same reductive effect as 23 parts of sodium.) At the time of his first experiments sodium was worth one hundred dollars per pound; he so improved the process for making this metal as to reduce the price to ninety cents per pound.

At this time the chloride of aluminium was regarded with

sodium as a curiosity of the laboratory; it was then produced in small quantities by heating alumina mixed with coal, in a porcelain tube, and passing over it a current of dry chlorine gas.

M. Ste. Claire Deville made further improvements in this process, so as to make it in an apparatus as large as a gas retort and in quantities proportional, at a price of twenty-five cents per pound. To produce the reaction of sodium with the chloride of aluminium was the most difficult point of the entire process. M. Ste. Claire Deville used for the reduction the distillation of the chloride of aluminium over the sodium, which was placed in trays of copper enclosed in a tube. The temperature developed by the reaction is very great if the current of the chloride of aluminium be rapid; by this process it was found that it required at least ten pounds of sodium to produce one pound of aluminium, (part of the aluminium produced being destroyed at its formation by the scoriæ,) when by the theory it required only two and a half pounds. This great loss of sodium and the difficulties in conducting this reaction on a large scale, were very great objections to the process.

All the aluminium at the Paris Exhibition was made by this process, and it was from a portion of this that M. Regnault made his investigations, and in which he found copper and iron.

The copper came from the trays in which the reduction was made. The presence of these metals in small quantities will account for the peculiar physical properties which he ascribed to aluminium.

Circumstances having interrupted M. Ste. Claire Deville in the experiments which he was making on a large scale, the subject rested for a while here. In the meanwhile Heinrich Rose suggested and made experiments with cryolite, (a fluoride of aluminium and sodium, (and gave his views that this mineral was a valuable substance from which to produce aluminium.

Wöhler made experiments also with cryolite, and arrived at conclusions somewhat similar to Heinrich Rose. They both succeeded in producing some of the metal, but the results were not entirely satisfactory.

M. Ste. Claire Deville again resumed his experiments, but instead of distilling the chloride of aluminium on the metallic sodium, as in his first experiments, he fused in a crucible, in the manner

pursued by Rose and Wöhler, using, however, with the double chloride of aluminium and sodium and the metallic sodium, the fluoride of calcium, (fluor spar,) or some cryolite as a flux. This experiment of M. Deville was very satisfactory, and the reduction in accordance with the theory.

While these experiments were in progress in Europe, similar ones were being made in this country by Mr. Alfred Monier, in Camden, N. J.; to him credit is due for having first made aluminium in the United States. Having had opportunities for examining his processes for making the double chloride of aluminium and sodium, metallic sodium, and the modes of reduction, melting and refining the aluminium, the conclusion is satisfactory that the discoveries of science have been successfully applied to render the manufacture of this metal an industrial art.

Mr. Monier in his experiments met with the same difficulties in the reduction. He found, however, by careful investigation and analysis, that the effect produced was also perfectly in accordance with the theory. When, after great difficulties, sufficient quantities of pure aluminium were obtained, and its properties as a metal carefully studied, it was found that it was not in the least degree oxidized by fusion with the nitrate of potash. This peculiar property causes a strong contrast between it and any well known metal, and this wonderfal fact produced a new phase in the manufacture of aluminium. Owing to this discovery, the efforts which had been made to produce aluminium from perfectly pure material was found unnecessary.

By using pure materials for its manufacture, it was necessary to employ apparatus which was very costly, as it required that it should be free from any injurious substances.

By the facility with which aluminium can be refined, owing to its peculiar properties to resist oxidation, it can be manufactured from impure and crude materials, in apparatus which can be cheaply made of still cheaper material, and without the great care and watchfulness necessary in the manipulations, where pure materials are employed.

Since July, 1855, Mr. Monier has made the double chloride by mixing alumina with salt (chloride of sodium) and coal, and by passing over this mass (ignited) a current of dry chlorine gas, (kaolin or common clay can be used instead of the alumina.) The

double chloride runs out from the condenser in a stream, and is collected in a receiver; it becomes solid when cold.

The reaction is so complete that no chlorine is lost. It has already been manufactured at a cost of eight cents per pound, but the operations were carried on to a very limited extent. It is, however, clearly (to be) demonstrated that, with works of sufficient size and a proportional economy in manufacture, the double chloride of aluminium and sodium can can be produced at a cost not exceeding four and a half cents per pound.

In the manufacture of sodium Mr. Monier has made considerable improvement; it has already been produced at a cost of twenty-five cents per pound.

In the manufacture of zinc, (by the Belgian process) one retort produces about thirteen pounds of metal in 24 hours. In the manufacture of sodium the reduction is so quick that 52 pounds of this metal can be produced in a retort of the same size in the same space of time.

The reduction of zinc costs from two to two and a quarter cents per pound. The amount of ore necessary, being from a half to three-quarter cents per pound. Giving for the cost of one pound of metal about three to three and a quarter cents.

The reduction of sodium costs about . . . 4 cents per pound.
The carbonate of soda, 2½ lbs., at 4 cts. . . 10 " "

Giving for total cost of one pound of sodium, 14 "

Sodium can be manufactured on as large a scale as zinc, and when the workmen have the same practical experience in the manipulations, the price of reduction will be still further reduced, so that the difference between it and zinc will be that of the first cost of carbonate of soda and the zinc ore.

It has already been shown that the double chloride of aluminium and sodium can be produced at a very low price; metallic sodium can also be made very cheaply; the reduction is readily effected in accordance with the theory, but the difficulty in uniting the metallic globules of aluminium when formed, is obviated by stirring at this point with a rod, and the destruction of the metal by the alkaline scoria is prevented by adding to the charge of the double chloride of aluminium and sodium, chloride of sodium and metallic sodium, either fluoride of calcium (fluor spar,) or cryolite.

By these means the greater portion of the metal is united in one mass, the other portion of the metal in small globules remains with the slag, which can be removed mechanically, or by first digesting in water; there will, however, remain about ten per cent. with the slag. This will be explained by the following data. Theoretically:

250 parts of metallic Sodium produce
100 " " Aluminium ;

70 parts are obtained in one metallic mass ;
20 " " in metallic globules ;

90 " being the nett produce.
10 " remain with the scoria.

Total, 100

The alkaline scoria contains large quantities of the chloride of sodium, that can easily be extracted by water, leaving an insoluble residue from which the fluoride of aluminium can be extracted by volatilization. The scoria containing the fluoride and the metallic aluminium is economically used by introducing it again with a new charge of the double chloride of aluminium and sodium, and metallic sodium, and by that means the loss of the metal is rendered very small.

Aluminium, when carefully removed from any slag, is readily fused in a crucible by itself; when in fusion (which is at a lower point than that required to fuse silver) the whole is stirred with a rod, and all the globules of metal are united in one mass with the greatest facility; at this point nitrate of potash can be added, (the stirring continued.)

All other metals are oxidized by this process; the refining is finished when the metal has a pure white color. It can now be poured into a mould of any shape.

Impure aluminium may be whitened by plunging it into caustic potash or soda, washing it quickly with distilled water, plunging it again into pure nitric acid, again washing quickly and thoroughly. The surface then has the color of fine aluminium, which it retains unless afterwards polished. This operation has for its

object to dissolve out the metals which darken the color of aluminium by their presence.

Aluminium forms alloys with nearly all the metals, but those which it forms with silver and copper are the most interesting.

Five parts of aluminium with one hundred parts of pure silver produce an alloy almost as hard as a silver-coin, which contains about one-tenth of copper, so that sufficient hardness can be given to silver, without introducing into it a poisonous or an alterable metal. It has the advantage of being worked like silver in a pure state, possessing, however, greater hardness, and being capable of a higher polish.

Ten parts of aluminium and ninety parts of copper produce an alloy of a pale gold color, possessing great hardness and considerable malleability; its hardness is greater than that of bronze, in the proportion of fifty-one to forty-nine. It can be worked when warm, with the same facility as the best soft iron.

Twenty parts of aluminium and eighty of copper give to the alloy the color and brilliancy of fine gold, and at the same time sufficient hardness to scratch the alloy of gold employed in coin, without imparing in the slightest degree its malleability.

By an increase of the per centage of copper in alloys of aluminium the alloy is rendered brittle, showing that the metal must be either used pure or alloyed in small quantities with the copper.

This explains the peculiar properties ascribed to it by M. Regnault in his investigation on the physical properties of the aluminium prepared by M. Deville, exhibited at the Paris exhibition.

Numerous experiments have been made (without regard to economy of manufacture) to obtain the aluminium directly from the oxide alumina, or from the fluoride of aluminium.

But the results obtained by the use of this double chloride of aluminium and sodium, have fully demonstrated that it is the most economical mode by which to produce this metal. Theoretically it requires—

3·86 Chlorine, at 6 cts. per pound	·23 16-100
1·86 Alumina, at 3 " "	·05 58-100
5·68 Carbonate of soda, at 4 cts. per pound . .	·22 72-100
Total,	·51 46-100

Making for the materials for manufacturing one pound of aluminium, estimated at the market prices, 5¼ cents. Practically it requires—

16 lbs. of the double chloride of aluminium and sodium, at 8 cts. per lb.,	$1 28
2¾ lbs. metallic sodium, at about 26 cents per lb.,	70
Flux and cost of reduction,	2 02
Total,	$4 00

By manufacturing on a larger scale, and by using the slag as a flux instead of employing fresh material, the lowest cost will be reduced to the following:

10 lbs. of double chloride of aluminium and sodium, at 4½ cts. per lb.,	$0 45
2½ lbs. of sodium, at 14 cts. per lb.,	35
Cost of reduction,	20
Total,	$1 00

It is seen that the actual cost of one pound of aluminium, when manufactured extensively, will be about double the theoretical cost as before estimated, (fifty-one cents.)

For the production of aluminium are used clay, salts, sulphur, manganese, lime and fluor spar, materials which are very abundant and cheap; all that is now required is practical experience, to reduce the price of the metal still nearer to the price of the raw materials, as has been before stated. The history of the useful arts contains numerous instances that, where skill and perfection of apparatus are required, difficulties are speedily overcome.

The density of aluminium when moulded is 2·56. The density of aluminium when rolled is 2·67. In equal weight with silver it is four times more voluminous. In equal weights with copper, bronze, bass and German silver, it possesses from three to three and a half times greater volume. In equal volumes with the above metals and alloys it possesses greater rigidity.

Mention has already been made of a very important property of aluminium when pure; that is to resist oxidation, a property which it possesses to a greater degree than the other metals.

Aluminium is not acted upon by nitric acid, hydrosulphuric

acid, or by the organic acids; slightly by sulphuric acid. It is but little affected by fusion with sulphur; mustard is found to act upon it slightly. Its true solvent is hydrochloric acid.

When we compare it in these respects with those metals, which are acted upon by most of these acids giving salts, which are more or less poisonous, the comparison is favorable to aluminium, as its salts, if formed, are innocuous.

According to M. C. Tissier, aluminium is not changed by a solution of nitrate or sulphate of copper, but it is dissolved by a solution of chloride of copper with the separation of metallic copper. It is attacked, however, by a solution of nitrate or sulphate of copper when it contains chloride of sodium, and this proves that chloride of copper is formed by the presence of the chloride of sodium. Aluminium is not attacked by an aqueous solution of alum, or by one of chloride of sodium, but a mixture of the two dissolves it with an evolution of hydrogen, and this proves that chloride of aluminium is contained in the mixture.

Wheatstone long since showed that aluminium was as strongly electro-negative as platinum. Its sonorous qualities are very great, like that of crystal. Various are the uses which can be made of the aluminium and of its alloys with silver and copper. All the purposes for which it could be advantageously employed in virtue of its peculiar properties, of not tarnishing by exposure to atmospheric agencies, and its lightness combined with its extraordinary strength, would be far too tedious to enumerate. A few instances only will suffice of its adaptability for philosphical apparatus, for all articles for table, for service and ornament, for kitchen utensils, for the works of clocks and even watches, for trappings of harness, for plate and door knobs, keys, &c. Its sonorous qualities render it valuable for making bells. In the galvano-plastic arts it replaces platinum.

Aluminium is most easily soldered with its own alloys. The alloys most convenient are those with silver, zinc or tin, their point of fusion being below that of aluminium. The soldering may be done by means of a spirit lamp, and without any previous cleaning.

Pure aluminium can be easily distinguished from impure by its greater whiteness, its indistinct traces of crystallization; occasionally one or two well-defined hexagons can be recognized on the surface of the ingots. The impure has a bluish tint like

zinc, and if the entire surface is not crystalline, the upper surface is always more so than in pure aluminium; the form of the crystals is also quite different.

In giving the theoretical proportion of material employed in the manufacture of aluminium, the relative cheapness of its production, its properties and strength when comparing it bulk for bulk with other metals, it is desired to demonstrate its valuable properties and uses, also to guard against the fictitious reports so current of its excessive cheapness.

NOTE.—The experiment of Sir H. Davy should be mentioned in the early production of this metal; he endeavored to produce it by passing the vapor of potassium over alumina at a white heat; he obtained only small grey particles interspersed with aluminate of potash.

BENZINATED SOLUTION OF ALUMINA.

By M. MENTEL.

The following preparation, to which M. Mentel has given the name "Benzinated Solution of Alumina" may be considered as a good hemostatic.

Dissolve one kilogramme (2lbs. 8oz. Troy) of pure sulphate of alumina in two litres (4¼ pints) of water. Saturate this solution with gelatinous hydrate of alumina, recently prepared, till it ceases to dissolve. Then add to this liquid 100 grammes (25 drachms) of amygdoloidal benzoin; bruised maintain the heat during six hours at a temperature of 140° to 176° Fahr., agitating from time to time, and regulating the evaporation so that the filtered solution will have a density of 30° Baumé, equal to a density of 1·261 at 59° Fahr. It is now filtered and put in a cool place (in the cellar in summer and at the temperature of 32° Fahr. in winter.) Some crystals of alum are thus formed by the union of the sulphate of alumina and some ammonia adhering to the gelatinous alumina, and separated. A transparent solution is thus obtained, of the density of about 1·250, remarkable for a very sweet odor and an astringent balsamic taste.

This benzinated solution of alumina not only possesses very decided anti-hæmorrhagic properties, but Prof. Laugier employed it with success in injections in leucorrhœa and ulcerations of the neck of the uterus, accompanied by fetid discharges. The strength is 2½ to 5 drachms to a pint of water.—*Jour. de Phar. Janv.* 1857.

ON CRYSTALLIZED HYDRATE OF BARYTES.

By Frederic Mohr, Ph. D., Coblentz,

Honorary Member of the Pharmaceutical Society of Great Britain.

Caustic barytes has been hitherto prepared by calcination of nitrate of barytes, or by boiling a solution of sulphuret of barytes with oxide of copper. The first process has been improved by me, by mixing the nitrate of barytes with coarsely powdered native sulphate of barytes, and heating the mixture in a crucible. By this simple manipulation the rising and overflowing of the fused salt has been entirely prevented. It has constituted until now the most expeditious and the cheapest process for preparing the crystals of hydrate of barytes.

The new process, for the first time here to be published, consists in precipitating caustic barytes by a solution of caustic potash or soda. The caustic soda is prepared from a pure carbonate of soda and caustic lime by the common method of boiling them together in a cast-iron vessel, until a filtered portion shows no more traces of carbonate of soda. The warm liquid is left covered for sedimentation, and after some hours' time the perfectly clear liquid is taken off by a glass syphon.

This is the solution of caustic soda to be used for preparing caustic barytes. To ascertain the quantity of any salt of barytes which can be decomposed by caustic soda, the alkalimetric strength of the soda must be previously determined. For this purpose ten cubic centimetres are taken off by a pipette, some drops of tincture of litmus are added, and then the strength is determined by a solution of oxalic acid of a certain and known strength, which is added until the color is changed to red. The strength of the solution of oxalic acid is prepared in the way originally suggested by Mr. J. J. Griffin, and recommended in my book *Die Titricmethode*, for volumetrical analysis. A litre of the solution contains sixty-three grammes of crystallized oxalic acid, thus representing the atomic weight of the acid. A cubic centimetre of this solution is therefore equal to the one-thousandth atom of any alkali. Supposing, then, that eight cubic centimetres of this solution were required to redden the litmus in ten cubic centimetres of the caustic soda, 800 cubic centimetres of the latter would decompose one atom of any salt of barytes. Ten cubic

centimetres of the solution of oxalic acid is the hundredth part of a litre, and one litre of the acid will saturate an atom of caustic soda. Therefore the number of cubic centimetres of the solution of soda required to saturate ten cubic centimetres of the solution of oxalic acid, must be multiplied by 100 to find the quantity required for one atom of a barytic salt. 800 cubic centimetres of this caustic soda would decompose 122 grammes of crystallized chloride of barium, or 130½ grammes of nitrate of barytes. The first named salt is the cheaper and easier to be prepared; but when any trace of chlorine is to be avoided in an investigation, the nitrate of barytes should be preferred.

The solution of caustic soda is boiled in a cast-iron pan, and the weighed quantity of the barytic salt added to it. A precipitate will be produced in all cases, because the caustic soda is hardly free from carbonic or sulphuric acid.

The decomposition will be complete as soon as the barytic salt has been dissolved, and the insoluble product may be easily separated, in consequence of the great solubility of caustic barytes in boiling water. It may be effected by filtration, but the process of sedimentation will be found to be far more expeditious. With this view the liquid is left covered for some time in a warm stove, not hot enough to cause ebullition or the disturbance of the sediment, but sufficiently not to prevent crystallization.

The precipitate of carbonate and sulphate of barytes is deposited very quickly, and after half an hour the liquid will be clear enough to be taken off by a syphon. It is put into suitable vessels of iron, china, or glass, from which free access of air is excluded, and set aside in a cool place to crystallize. The whole liquid often crystallizes into a solid mass of acicular crystals of caustic barytes, the mother-liquor being entirely absorbed by the mass. The crystals are put into a funnel, and when the greater part of the liquid has drained away, the funnel is placed in an oblique direction in a centrifugal engine, and by the rapid motion of the engine much of the remaining mother-liquor is thrown off. The crystals are thus got in a state in which they will hardly wet filtering paper when placed upon it. By re-dissolving in a small quantity of boiling distilled water, and crystallizing a second time as before, the crystals are obtained in a sufficient state of purity.

By this means large quantities of caustic barytes can be prepared at a cost not much greater than that of a common salt of barytes, and this substance may therefore be applied for purposes for which it was previously inapplicable on account of its high price.

I may be permited here to allude to the preparation of caustic potash for mineral analysis. It is very difficult to obtain caustic potash from the carbonate, so as to be free from silica, chlorine, and sulphuric acid, but sulphate of potash being free from silica and chlorine, and one of the purest of the salts of potash, it is very easy to prepare the caustic alkali from the sulphate by means of caustic barytes. If the barytes has been made from the nitrate, it will contain no chlorine; silica cannot be present, and sulphuric acid will be completely precipitated.

Common caustic potash, which has been prepared with carbonate of potash and lime, can be deprived of the last traces of carbonic and sulphuric acids, by adding the requisite quantity of caustic barytes and leaving the mixture for the precipitates to subside. This cannot be affected with caustic lime, as that substance is too little soluble in water, and is, moreover, incapable of decomposing sulphate of potash.

A solution of caustic barytes is used for absorbing carbonic acid from gases; but in this case, as the absorption proceeds, the solution becomes progressively weaker. I have suggested the use of a mixture of caustic potash and barytes for the same purpose, with complete success. The caustic potash absorbs the carbonic acid, and the barytes precipitates it. In this way the absorbing liquid—the potash—is kept always of the same strength and completely caustic, while the carbonic acid, as it is absorbed, is eliminated by precipitation.

Carbonic acid is more difficultly absorbed in proportion to the extent of its admixture with permanent gases which are not subject to absorption. This result is experienced in the analysis of atmospheric air, where there are only four or five volumes of carbonic acid in ten thousand volumes of the air. Hence the determination of the quantity of carbonic acid in air has been attended with much uncertainty and difficulty. The simple absorption by solid substances in tubes, and the determination of the increment of weight, as proposed by Brunner and other

chemists, has given most erroneous results. In that process the air must be completely dried by sulphuric acid or chloride of calcium. Now, it has been found that sulphuric acid absorbs no inconsiderable quantity of carbonic acid, which will not be got in the tube in which that body is proposed to be estimated. Then chloride of calcium is decomposed by the ozone of the atmospheric air, and loses an atom of chlorine for every atom of active oxygen or ozone. The chlorine thus disengaged is absorbed by the caustic potash or lime, and causes an increment of weight, which would be erroneously ascribed to carbonic acid. Thus, in some cases in which the air has been very dry, the chloride of calcium has lost rather than gained weight by the passage of the air through it.

It has, therefore, been found necessary to recur to the old process of Saussure. But the trouble of exhausting large balloons by an air-pump, the costliness of the whole apparatus, and the impossibility of transferring it from place to place, have prevented Chemists from generally adopting this process. Hence Saussure's results stand alone, being unsupported by parallel experiments. It has, however, been found practicable to effect the complete absorption of carbonic acid from atmospheric air with a mixture of caustic potash and barytes, by causing the air to pass through a glass tube of from sixteen to eighteen inches in length, and three-quarters of an inch in diameter, placed in an oblique direction. The current of air is produced by the dropping of water from an aspirator in connexion with the absorbing apparatus. Single bubbles of air rise in slow succession through the obliquely-placed tube, and are thus kept for about ten seconds in contact with the absorbing liquid. The air passes into the apparatus in its ordinary state, deprived neither of moisture nor ozone, as these substances do not interfere with the result. The volume of air is ascertained by measuring the water, and reducing it for pressure and temperature. The carbonate of barytes from forty or fifty litres of air is so small a quantity, that it cannot be well determined by weighing it upon a filter, and I have adopted the method of determining this quantity by a solution of nitrate of silver, which gives uniform results and is very accurate. This process is described in my work on Volumetrical Analysis.

In conclusion, it may be predicted, with great probability, that caustic barytes being once easily and cheaply prepared in large quantities, will be applicable, not only to scientific researches, but alto to industrial and commercial purposes.

Mr. Redwood said the Society was much indebted to Dr. Mohr for this valuable practical paper. The method suggested for the preparation of crystallized hydrate of barytes appeared to be a very good one. The proposed applications of caustic barytes were also well worthy of consideration, especially that which related to the production of pure liquor potassæ. This was often required for analytical purposes, and Chemists not unfrequently found it difficult to obtain the preparation in a sufficient state of purity to render it suitable for use in some cases, as, for instance, in the separation and estimation of alumina. If used, as Dr. Mohr suggested, for purifying the liquor potassæ made in the usual way, much caution should be exercised to avoid leaving baryta in the solution, especially if it was intended for use in medicine, as barytes possesses poisonous properties.—*Trans. Lond. Pharm. Society, in Pharm. Jour. Dec.* 1856.

IODISED GLYCERINE IN VARIOUS DISEASES OF THE SKIN.

By Dr. Richter, of Vienna.

This solution is prepared by dissolving one part of iodide of potassium in two parts of glycerine, and pouring this liquid on one part of iodine, which it dissolves completely. This solution has the great advantage over alcoholic solutions of not drying; in consequence the surfaces remain supple, and the action and absorption of the iodine continues for a long time. To use the solution it must be spread upon the diseased parts and covered with gutta percha paper to prevent the evaporation of the iodine, and to augment the perspiration of the parts which have been touched. The apparatus is left untouched for twenty-four hours and the degree of the reaction regulates the further application, as for example, bathing with cold water and fresh application. The iodised solution occasions pain, which varies in intensity and duration, according to the state of the diseased part and the sensitiveness of the individual. There has, however, never been

any general inconvenience. On removing the apparatus, the healthy skin has become brown and the diseased portions paler colored than before. On ulcerated surfaces, no trace of iodine will be found two hours after its application. Sometimes the action has been sufficiently powerful to produce *phlyctene.*

The results of Dr. Richter's experiments is, that this tincture acts as a caustic; that it has a really heroic action in cases of lupus, that its efficacy is remarkable in non-vascular gôitre, scrofulous ulcers, constitutional syphilitic ulcers; doubtful in primitive chancres and eczema, and *nil* in psoriasis. The following is one case of lupus cured:—

A man had been troubled with hypertrophic lupus from his childhood; his face was utterly disfigured, ulcerated in several places, and in which two holes represented the eyes, and a circular opening the mouth. The skin of the neck was so much thickened that there was a straight line from the chin to the sternum. To diminish the pain of the application of the iodised solution on so extensive a surface, it was divided into two portions, first the neck and lower jaw and after their cure, the rest of the face. Each application occasioned pain for about two hours, and from the very first iodine was found in the urine in large quantities. The hypertrophy diminished by degrees, the ulcers became covered with a very thin epidermis which gradually thickened and then became small flat cicatrices. Fifty-five cauterisations in the space of three months sufficed to produce a complete and unhoped for cure.—*London Chemist, from Wiener med. wochens-schrift.*

THE GUMS AND RESINS OF COMMERCE.

By P. L. Simmonds.

(Continued from page 80.)

Leaving the true gums, we come now to the Resins. These are either natural exudations or are obtained from some vegetable compounds by the aid of alcohol, in which they are generally soluble, although totally insoluble in water. They are for the most part brittle, tasteless or insipid, fusible at a moderate heat, soluble in the fixed and volatile oils, and some in the muriatic and acetic acids. They have no smell, except when they retain

a portion of volatile oil, in which case they partake of the smell and acid taste of that oil. Resins generally burn with a strong yellow flame, emitting at the same time a vast quantity of smoke. Dammer affords a good example of the resins.

It is strange that of the origin of substances at once so valuable and so familiar to us so little should be known. The sources of the dammer and many of the wood oils from Singapore and the Eastern Archipelago are little known, nor are the copals, the anime, the myrrhs, and other valuable gums and resins from Africa, Zanzibar, &c., well defined.

COLOPHONY, the ordinary resin of commerce, is the residuum remaining in the body of the still after common turpentine has been submitted to distillation for the manufacture of the oil of turpentine of commerce, or spirit of turpentine. The black resin, or colophony, is the cooled brittle mass in the state in which it leaves the still; the amber or yellow-colored is the same resin mixed with about one-eighth part of water while it is yet fluid.

Large quantities of resin oil, or pine oil, as it is generally called, are made in the metropolis and in the neighborhood of Liverpool, Hull, Bristol, and Glasgow, and it is employed in the manufacture of grease for lubricating the bearings of heavy machinery, and the axles of railway wagons, &c. It is much used in France for the manufacture of printing ink, and hence a principal source of the unpleasant odor of some of the French newspapers. About 23,000 tons of rosin are annually imported, of which the bulk comes from America, and a little from the Hanse Towns. One of the most important oleo-resins in a commercial point of view is turpentine, of which we import from 17,000 to 25,000 tons per annum, almost exclusively from the United States. The comparative receipts in the last nine years have been as follows:—

	Tons.		Tons.
1846, .	17,897	1851, .	21,790
1847, .	16,193	1852, .	24,080
1848, .	20,089	1853, .	19,650
1849, .	20,666	1854, .	17,038
1850, .	21,731		

In the State of North Carolina, about 800,000 to 1,000,000 barrels of turpentine are now annually made, giving occupation

to about 5000 laborers in making it, and perhaps three times as many more human beings are supported mainly from the proceeds of its first sale. There are about 200 stills in operation there. The income of North Carolina from her pineries alone must reach half-a-million sterling.

The multifarious uses of the pine tree seem to augment with the development of the inventive talent and ingenuity of the age. Manufacturers already extensively use it in various processes. The painter draws deeply upon the turpentine to paint the four million of dwelling houses in Great Britain, and the same number in the United States, besides the carriages and other vehicles. That great lever of public opinion, the press, could not put forth a printed page without it. Turpentine to the value of £50,000 or £60,000 is annually consumed in America by the India rubber manufacturers. The new process of lighting up houses and whole cities with rosin-gas in America is consuming every barrel made, and has greatly raised it price there. The soap-maker, too, has long used it, and could not now dispense with it.

A liquid resinous exudation known as Chian or Cyprus turpentine is obtained from Syria and the Greek Archipelago from *Pistacia terebinthus*. The trunks of the largest trees are cut across with a hatchet, and the turpentine runs down on flat stones placed for the purpose, where it hardens. The quantity obtained from each tree is only about eight or ten ounces.

The coniferous trees of Europe and America furnish the turpentine, tar, and pitch of commerce, especially in Europe, *Pinus sylvestris*, and *P. pinaster*.

The swamp or long-leaved pine supplies the chief portion of the turpentine, tar, &c., consumed in or exported from the United States. *P. tœda*, abundant in Virginia, yields common turpentine, but of a less fluid quality than that which flows from the preceding species.

The resins are chiefly used in making varnishes and lacquers, for several purposes in dyeing, for sealing wax, and for ornamental house papering.

Varnishes may be divided into three classes, spirit varnishes, volatile oil varnishes, and fixed oil varnishes. The first class

are easily prepared and applied, dry quickly and are free from unpleasant smell; they are used for articles of furniture and musical instruments.

The resins which enter into their composition are seedlac, benzoin, anime, or thus. The varnishes made with essential or volatile oils are chiefly used for pictures—caoutchouc, and oil of turpentine, (turps, as it is familiarly termed,) enter into their composition. Fixed oil or fat varnishes dry easily, at common temperatures, and form a solid and nearly colorless glazing suited for coach panneling and house painting.

The fine copal varnishes do not dry so readily as if mixed in the proportion of three parts of anime and one of copal. Oil varnishes require to be kept a considerable time to ripen, as it is technically termed, before they are fit for use, the time varying from three to twelve months, according to the purpose for which they are intended, in order that the driers and other feculencies may be deposited and the varnish become bright and transparent.

Varnishes are very extensively employed in the arts and for domestic purposes. When we consider the large number of vehicles in use of various kinds, the superior classes of which, as private coaches, omnibuses and cabs, railway carriages, and the paint-work of ships' cabins, houses, and household furniture, pictures, &c., all require varnish, we shall be able to form some slight idea of the consumption. The tenders for one railway company alone, the London and North Western, are for 1500 gallons at a time. Gold and bronze lackering, and varnish for stoves, &c., are other uses. The recent permission to use methylated spirit in the manufacture of varnish, free of duty, bringing down the price some 10*s.* to 12*s.* a gallon, will give even a further stimulus to the demand for resins, and probably lead to the more general employment of varnishes for wood-work instead of paint.

According to Thunberg, the very best Japan varnish is prepared from *Rhus vernifera*, which grows in great abundance in many parts of that country, and is likewise cultivated in many places on account of the great advantages derived from it. This varnish, which oozes out of the tree on being wounded, is procured from stems that are three years old, and is received in some proper vessel. At first it is of a lightish color, and of the

consistence of cream, but grows thicker and black on being exposed to the air. It is so transparent when laid pure and unmixed upon boxes or furniture, that every vein of the wood may be seen. For the most part a dark ground is spread underneath it, which causes it to reflect like a mirror, and for this purpose recourse is frequently had to the fine sludge, which is got in the trough under a grindstone, or to ground charcoal; occasionally a red substance is mixed with the varnish, and sometimes gold leaf, ground very fine. This varnish hardens very much, but will not endure any blows, cracking and flying almost like glass, though it can stand boiling water without any damage. With these the Japanese varnish the posts of their doors, and most articles of furniture which are made of wood. It far exceeds the Chinese and Siamese varnish, and the best is collected about the town of Jesino. It is cleared from impurities by wringing it through very fine paper; then about a hundredth part of an oil called *toi*, which is expressed from the fruit of *Bignonia tomentosa*, is added to it, and being put into wooden vessels, either alone or mixed with native cinnabar, or some black substance, it is sold all over Japan. The expressed oil of the seeds serves for candles. The tree is said to be equally poisonous with the *Rhus vernix* or American poison tree commonly called swamp sumach.

The varnish tree of the Burmese (*Melanorrhœa usitatissima*) is spread over a wide range of country, extending from Memipur, in lat. 25 N. long. 94 E., to Tavoy, lat. 14 N., long. 97 E. It attains its greatest size in the valley of Kubba, distance about 200 miles from the sea-shore. The trees average about 30 or 40 feet high, and have a circumference of from five to eleven feet, four feet above the ground. A good tree yields from 10 to 12 lbs. of varnish annually, and its value at Prome, on the Irawaddy, is about 10*d.* the pound; it is used in enormous quantities by the natives as a lacquer.

Dr. Wallich states that the natives never experience those deleterious effects from handling the varnish in its liquid state, which Europeans generally suffer; in its fresh state, it has very little pungency of taste, and is altogether devoid of smell. The natives are very apt to adulterate that brought to market with sesamum oil.

Wood Oils.—This class of resinous oils, known in all the Indian bazaars as gurgun oils, is obtained by tapping certain trees of the order Dipterocarpeæ (*D. lævis*, Hamilton; and *D. turbinatus*, of Roxburgh), and applying heat to the incision. The tree is a native of Chittagong, Pegu, Assam, the valley of Kubba, and the jungles of the Malayan peninsula, and grows to a great height. It is described as having a straight stem, of more than forty feet to the first branch. When not tapped too soon, the base of the trunk is often of immense girth, having a circumference of thirteen feet and upwards. About the end of the dry season, that is, in March and April, several deep incisions are made with an axe into the heart of the wood, and a good sized piece scooped out; into these holes fire is placed, and kept burning until the oil begins to run, when it is received into a bamboo, and allowed to ooze slowly drop by drop. The average produce is about 40 gallons in each season. The oil which flows from the wound is a mixture of balsam and volatile oil, and when applied as a varnish to wood or other substance, the oil evaporating deposits a hard and durable coat of resin.

These wood oils are chiefly used as natural varnishes, either alone or in combination with colored pigments; also as a substitute for tar in paying the seams of shipping, and for preserving timber from the attacks of white ants. They are said also to be useful as an ingredient in lithographic inks. This oil has all the medical properties of some of the more esteemed balsams.

From the comparatively imperfect knowledge we possess of the trees from which these valuable substances are derived, the oils generally receive the names of the localities from which they are imported—hence there are wood oils from Canara, and the Madras Presidency, Malacca, Pegu, Moulmein, and Rangoon, Singapore, Tinnevelly and China. The last named deserves notice, as being one of the substances of which the well-known and much prized Chinese lacquer is made. It is used in Singapore for painting the beams and wood-work of native houses, and may also be mixed with paint when not exposed to the sun.

Dammer is the eastern name for a kind of indurated pitch or turpentine exuding spontaneously from various trees indigenous to most of the Indian islands. The principal species are *Dammara Australis* (Don), the Kauri tree of New Zealand, and *D.*

Orientalis, the pitch tree of Amboyna. The trees yield the dammer in amazing quantity, and generally without the necessity of making incisions. It exudes through the bark, and is either found adhering to the trunk or branches in large lumps, or in masses on the ground under the trees. As these often grow near the sea-side, or on the banks of rivers, the dammer is frequently floated away, and collected in distant places as drift. It is exported in large quantities to Bengal and China, and is used for all the purposes to which we apply pitch, but principally in paying the bottoms of ships. About 200,000 bundles of dammer are annually exported from Siam. Dammer fetches from 26*s.* to 32*s.* per cwt. in the London market. 100 to 300 cwt. of dammer and resin are annually exported from Ceylon.

The fruit of *Diospyros embryopteris*, a native of the East, is so glutinous as to be used in Bengal for paying boats. A cheap and ready substitute for tar for preserving cordage, &c., might easily be found in some of the numerous resins and gum elastics of India.

Copal is a valuable and singular kind of resin that, according to some authorities, naturally exudes from different large trees found in the East Indies. Dr. Ruschenberger (*Voyage Round the World*) still asserts that it is a gum found about the roots, whence it is dug up in large quantities, and is often obtained from places where the tree had been grown many years before. The best copal is of a bright yellow color, as transparent as amber, in small rounded lumps or flat pieces, hard and brittle, but easily reduced to powder. Its specific gravity is about 1·100. When dissolved in linseed oil, it forms a beautiful varnish, which, when applied to pictures, snuff-boxes, tea-trays, &c. gives lustre to the painting and brings out the colors. Copal is liable to be confounded with gum anime, which exudes from the roots of the locust tree (*Hymenæa courbaril.*)

According to M. Landerer, of Athens, there are three varieties of copal, differing from each other in their properties, viz., Brazilian, West Indian, and East Indian or Levantine copal. The latter variety is sold in the bazaars of Jerusalem, Mecca and other places, as a species of choice incense, and it plays a leading part in all the fumigating drugs of the East. The people employed in the collection of the copal in Palestine and Abys-

sinia dig deep trenches round the tree, and then collect and sort the pieces of gum which fall into them. They are afterwards freed as much as possible of the earth that adheres to them by washing and stirring. African copal is obtained from a species of *Hymenœa*, and from fourteen to seventeen tons are imported to Liverpool from Sierra Leone. New Zealand copal is the Kauri gum; Brazilian copal is the produce of *Trachylobium Martianum*. The imports of gum copal, which in 1846 were 549 tons, dropped in 1849 to 200 tons. From the Phillippines we imported 354 of copal cwt. in.1851, 338 cwt. in 1852; and 479 cwt. in 1853; and from Singapore the imports have lately been increasing. In 1849 we received from that entrepot 53 cwt.; in 1850, 40 cwt; in 1852, 218 cwt.; and in 1853, 521 cwt. The trade reports also record the import of 832 cwt. of copal from New Zealand in 1852, and from those islands 3217 cwt. of gum not enumerated, were received here in 1853. In commerce, copal is distinguished into the hard and soft kinds. The chief varieties of the former are—First, copal from Madagascar (in large flat yellow pieces), which, when cold, is tasteless and odorless, but when heated diffuses an aromatic odor: this kind is rather rare. Secondly, the East India copal, the most common commercial variety; it is rough on the surface, bearing the impression of sand. The best specimens are colorless, and in small pieces, constituting the copal from Calcutta. A third, but very small variety, is brought from the Brazils and south of Africa. We receive all the copal proper of commerce from India, whatever its primary source may be. In the Calcutta variety, pieces of all the others are to be found; nor is a distinction readily to be made between the white copal of Calcutta, and the yellow resin of Bombay; the difference appears to depend only on the care bestowed on the selection and purification of the pieces. The various resins, from anime to soft copal, Indian and Madagascar, seem to form a continued series, differing only in the increased quantity of oxygen they contain. A curious variety of copal is that in the pebble form, rounded by the action of the water, of which there are specimens on the table.

Copal is the Mexican generic name for all resins. In the collection of products from Mexico shown at Paris, there were several resinous gums, of which no particulars, however, were

obtainable—one, an unnamed resin, very much like anime; another termed Axin resin, which burns with little flame and blackens, having evidently much gum with it—a whiter kind, called Archipan resin, has much the same properties, and a bitter flavor. A nominal copal from the same quarter, resembles very closely the resin of Tacamahaca, being of a white color, with a coniferous smell.

Gum Anime of commerce is a resin of great value to the varnish maker, but is now largely replaced by copal. Much of the anime received is believed to be the produce of the locust tree, *Hymenœa Courbaril*, and is, therefore, Western anime, the Courbaril resin of Demerara. It is obtained there by digging in the vicinity of the roots of the tree, from which it exudes in a vertical direction in columns or pieces, upwards of a foot in length. It may also be obtained by tapping the tree, when in the course of a few days a large solid mass is formed. It may be obtained in great abundance in various parts of British Guiana.

The best anime is, however, obtained from Zanzibar, and some other parts of Africa, whence it is imported in mats, and the fine and medium in cases. The imports are not large of gum anime. In some years it has reached thirty tons, in others it has not exceeded five or six. We now receive about 280 tons.

(To be continued.)

ALOINE.

By Mr. T. B. Groves.

In the July, 1851, number of the *Pharmaceutical Journal*, appeared a paper by Messrs. Smith of Edinburgh, on Aloine, a crystalline principle they had succeeded in isolating from Barbadoes aloes, and which they regarded as its active principle. They proved also the existence of this body in a crystalline state in the Cape and Socotrine varieties, though they succeeded in obtaining from them only very insignificant quantities.

The behavior of aloine with reagents was fully detailed by them, and its formula supplied, as obtained by Dr. Stenhouse.

This latter Chemist also devoted considerable attention to the subject, and arrived at the same results as Messrs. Smith—that

aloine is scarcely obtainable in sufficient quantity, or in such a state of purity as to be recognizable, from any other than the Barbadoes variety.

M. Robiquet, in an article read to the Académie de Médecine, Feb. 26, 1856, and published in the *Chemist* of July, 1856, arrived at the same conclusion with regard to Cape and Socotrine aloes, but gives a much more easy and productive process for its preparation from Barbadoes aloes.

All these gentlemen express their belief that the opaque varieties alone contain any considerable proportion of aloine in a crystallizable state, and that the vitreous or translucent varieties have undergone the action of heat subsequent to inspissation, and that the fusion has converted the aloine into an amorphus substance, quasi-resinous. From a perusal of the works of the two first experimenters, and a consideration of what had hitherto been published respecting the manufacture of the different varieties of aloes, I was early led to doubt the accuracy of some of their conclusions.

For instance, Pereira states that the best Barbadoes aloes is procured by evaporating in a copper vessel over a naked fire the juice that spontaneously exudes from the transversely cut stems of the aloe (the decoction of the leaves is not unfrequently used), and that the evaporation is carried to such a point that the extract on cooling "breaks short"—in other words, has been reduced to dryness and incipient fusion.

The Socotrine, on the contrary, appears to be the pure spontaneously exuded juice of the cut leaves, evaporated, after depositing its grosser parts, by the sole agency of the sun.

If it be true then that aloine is so readily altered by contact of air, simultaneously with the application of heat, one would scarcely be justified in attempting its preparation from the former kind, without first applying to the latter.

Again, aloine is proved to be but slightly soluble in cold water; then why use cold for its separation? or ether, which dissolves it so sparingly?

I shall be able to show that Socotrine aloes contains a considerable proportion of crystallizable aloine, to be obtained from it without extraordinary difficulty or precaution.

The following circumstances that occurred shortly after the

publication of Messrs. Smith's paper, first suggested an inquiry. I was engaged in filling a small pot with the aqueous extract of Socotrine aloes, when I was called away for a short time, and on returning, observed that a bubble of considerable size had, by the gradual subsidence of the extract, formed on its surface. The extract, when first made, had been perfectly transparent, but the surface of the bubble I observed to be studded with bodies of a regular shape, which unassisted sight enabled me to recognize as crystals of aloine—the microscope afforded more certain evidence.

I will hear observe parenthetically, that by cautiously blowing a bubble of a suspected extract, a very trifling amount of crystallization may be detected, that cannot readily be discovered in any other way.

The extract that afforded this indication had been prepared by exhausting Socotrine aloes with boiling water; filtering the cooled liquor, a little carbonate of magnesia being previously added; and evaporating by a steam heat. The exhaustion requires a little knack. The aloes should be closely powdered, and sifted through a 40-hole brass seive, then shaken lightly off a wide spatula into the boiling water, kept in constant agitation during the addition, and maintained in that state for twenty minutes after. The aloes will by this means be completely exhausted, and, by allowing the liquor to stand quiet till cold, the resinoid substances will deposit and adhere to the bottom and sides. The magnesia is added without decanting the liquor from the vessel. It filters very readily through serge, affording a perfectly bright liquid and extract. It is rendered turbid by the addition of acid.

Aloine has not been permanently introduced into medical practice in this part of the world, so that I had no inducement to prepare a larger quantity than sufficed for experiment. Indeed, in investigations in general, the smaller in reason the quantity of material operated on, the greater will be the care expended on it, and less dubious the results arrived at—the chief disadvantage being the loss occasioned by not being able to economise the mother-liquors.

One ounce of Socotrine aloes was therefore powdered and exhausted as previously described. When cold, hydrochloric acid

was added to slight acidulation—a resinous precipitate was formed, which caused filtration to proceed with great difficulty. The addition of finely-powdered wood charcoal would have much facilitated it. Washed arrowroot has not so good an effect. The solution was, after filtration, evaporated by a water-bath to the consistence of syrup, transferred to a small basin covered by bibulous paper, and set aside on a shelf of the laboratory.

In less than a week crystallization had commenced; in a fortnight it had become a mass of crystals, that had grown irregularly, considerably above the level of the liquid. They were transferred to coarse blotting-paper, allowed to drain a day or two, then shifted to another piece, wrapped in it, and gently pressed by means of a weight. Cautiously proceeding thus, they were at last powerfully pressed with a screw, and presented the appearance of a brown-colored brittle mass. This was dissolved in as small a quantity as possible of boiling water, allowed a few days to crystallize, and then treated as before. A third crystallization sufficed to procure crystals of a pale lemon color (pure aloine), which weighed when dry 48 grains—10 per cent. of the aloes employed. I found it was necessary to dry them in the compressed mass, closely wrapped in blotting-paper, and at a temperature of about 100. The surface and edges only were oxidized, and were removed before powdering and weighing. When thoroughly dry, it does not appear to undergo any change at the ordinary temperature. When damp, however, and at the same time exposed to heat, it oxidized rapidly, and could be made to assume almost exactly the appearance of the aloes whence it was originally taken.

I am therefore of opinion that it is not to their possessing a vitreous character, but to circumstances connected with the composition of the original juice from which they are made, that the various degrees of facility with which aloine may be obtained from them is due, and that aloine may be procured from all that have not been actually carbonized.

With respect to its purgative power, of which M. Robiquet denies it the possession, and which, to cause such variety of opinion, must at least be very uncertain, I think with M. R. that it is only when oxidized it possesses that power. It would be impossible for it to pass through the intestines without some de-

gree of oxidation, and that degree would vary as circumstances varied during its passage: the variation of its purgative activity is hereby accounted for. M. R. proposes to use it for the treatment of fever, &c., as an antiperiodic, and with the idea, I presume, of preventing its oxidation, and consequent aperient effect, gives it in combination with finely divided metallic iron (fer réduit).

Perhaps were the dose enveloped in wax or spermaceti, or still better, in Evans's membrane capsules, so that it may pass into the bowels previous to solution, the result would be more uniform.—*Pharm. Jour.*, Aug., 1856.

ON THE DETECTION AND ESTIMATION OF QUINIA AND OTHER ALKALOIDS IN FATTY OILS.

By William Bastick.

Having been required to examine some specimens of cod-liver oil with quinine, with a view to ascertain the presence of that alkaloid and its quantity in them, and there being no published method for the accomplishment of these objects, I have been compelled to devise one. Believing this method to be as simple as it is effectual, not only for the detection and estimation of quinine when dissolved in cod-liver oil, but also for the discovery and separation of other alkaloids when combined with the fatty oils in general, I venture to lay it before the Members of this Society. To render my method more intelligible, I will briefly describe an example of its actual application. Two ounces of the oil supposed to contain quinine were measured off, introduced into a bottle capable of holding four ounces of liquid, and then one ounce of a solution, consisting of sulphate of soda dissolved in distilled water, and slightly acidulated with sulphuric acid, was added. After closing the bottle, the contents were strongly and repeatedly agitated, so as to thoroughly mix the watery and oleaginous liquids. After these liquids had separated again by rest, half an ounce or rather more of the aqueous solution was removed from the bottle by means of a pipette, and passed through a filter, to separate a few small globules of oil still adhering to it. As half an ounce of this filtrate corresponded to one ounce of the oil under examination, care was taken to mea-

sure off this quantity correctly for the final operations, which consisted in precipitating the quinine therefrom by means of a solution of caustic soda, slightly washing the precipitate with distilled water, redissolving it in alcohol, and after filtering the alcoholic solution, evaporating it to dryness in a water bath. The residue was then weighed and examined in the usual manner, to ascertain if it were quinine.

I need scarcely explain that the sulphate of soda in the acid solution is employed to effect the more ready and complete separation of the watery fluid from the oily one, and that the sulphuric acid is added to dissolve out and combine with the quinine which exists in the oil in (if I may use the term) a caustic condition.

From experiments made with cod-liver oil with quinine, prepared by myself, of known strength, I feel justified in observing that the method described gives sufficiently accurate results to be relied on for all practical purposes.

In cases where other alkaloids have to be detected and estimated, the process of separation to be employed would be precisely similar to that described for the separation of quinine. When separated, they will of course be recognized by the methods laid down in the text books on chemical analysis.

In conclusion, I may add that the quantity of sulphuric acid employed in this process should be sufficient to render the aqueous fluid slightly acid after it has been well agitated with the oil containing the alkaloid, and that the proportion of the extracting fluid may be varied, in accordance with the convenience of the operator, and the nature and quantity of the alkaloid to be extracted.—*London Pharm. Journ. Nov.* 1856.

CHEMICAL RESEARCHES ON HAIR AND HORNY SUBSTANCES.

By M. Von Bibra.

It has long been admitted, that the color of hair and fur is not due to a coloring matter, but that it depends on the structure of the appendages. This is also confirmed by Von Bibra's researches, in which he vainly endeavored to extract the coloring matter. On this point, microscopy may give more information than chemistry.

Hair, as well as the horny substances, is free from phosphorus; they contain sulphur in variable proportions, which the author has estimated in the following manner; the substance divided as much as possible, was burned with saltpetre containing carbonate of soda, the residue having been treated with nitric acid at the boiling temperature, the estimation is made by means of chloride of barium.

The following numbers refer to the sulphur contained in 100 parts of dried hair; two estimations were most frequently made of the same substance:—

Human hair.	Sulphur per cent.	
Woman of 93, grey hair, formerly fair	4·30	
" 93, dark brown, mixed with grey	4·17	
" 87, grey hair	4·76	
" 84, white hair	4·30	
Man of 81, white hair	5·76	
" 80, white hair	4·62	
Woman of 71, grey hair	4·08	
Man of 49, chesnut, mixed with grey	4·63	
Woman of 40, dark chesnut	3·92	3·98
Man of 32, chesnut	4·36	4·37 4·40
" 30, red	8·23	7·77
Girl of 20, very fair	4·17	4·22
Boy of 18, red	4·21	4·12
" 16, chesnut	4·27	4·31
" 15, chesnut	4·69	4·64
Girl of 15, fair	4·27	4·31
Boy of 14, auburn	4·32	4·40
" 12, auburn	4·82	5·00
" 12, red	5·72	5·80
Girl of 10, chesnut	4·37	4·28
Boy of 9, red	5·22	5·34
" 3, fair	4·25	

Whence it may be concluded, that the average proportion of sulphur contained in fresh hair, is about 4·50 per 100.

This proportion has likewise been obtained with hair detached from the cranium of a Peruvian buried more than four centuries, and from an individual of the race of Titicaca, of nearly 1000 years ago.

These ancient hairs had not lost their hygroscopicity.

We sometimes meet with, in the soft parts of the organism, masses of hair resulting from an abnormal development, and which must not be confounded with the pellets of hair found in

the stomach of certain ruminating animals. Such masses sometimes exist in the ovaries of woman; it was on hair of this kind that M. Von Bibra operated; these hairs have also been found between the muscles of the thigh of an ox. These hairs contain one per cent. of sulphur, much less than the hair of the ox contains.

The furs of various animals, contain in general less sulphur than human hair; the author arrives at this conclusion, in consequence of a great number of experiments on the hair of the most various mammifera; sheep's wool contains the least, 0·81 per cent.; chamois hair contains the most, 5.10 per cent.

Sulphur of the Horny Substance.	Sulphur per cent.	
Ox horn		3·00
Antelope's horn	1·17	1·30
Sheep's horn	1·72	1·75
Chamois horn	3·20	3·21
Rhinoceros' horn	3·09	3·20
Hare's hoof	2·90	2·91
Roebuck's hoof	3·02	
Chamois hoof	1·50	1·42
Sheep's hoof	1·12	1·28
Ox's hoof	1·51	1·37
Elk's hoof	0·86	0·88
Calves hoof	1·51	1·71
Dog's nail	2·80	2·69
Fox's nail	2·73	2·81
Bear's nail	1·25	1·48
Man's nail	2·71	2·74
Nail of hypertrophy	2·05	2·19
Whalebone	3·44	3.54
Skin cast off from the viper	0·88	

Fat and Inorganic Principles.

Hair and fur contain fat and mineral substances in variable proportions. Age and color appear to have no influence in this case. It is not the same with them as with feathers, which, according to M. Gorup-Besanez, contain so much the more inorganic matters, and especially of silica, as the bird is further advanced in age.

The mineral substances contained in the hair of man, are the sulphate of lime and sulphate of magnesia, phosphate of these bases, iron, silica, chlorine and a little alkali. Furs, silks and

horse-hair furnish ashes containing all the substances which have just been mentioned.

The ashes of the horns of the ox and the buffalo, those of the hoof of the ox and the roebuck, as well as the hoof of the elk, were rich in sulphates of lime and magnesia; there was also silica and traces of phosphate; there was neither chlorine nor iron; the ashes of hair and fur always contained carbonic acid; the ashes of horns and hoofs above mentioned were quite free from it.

The fatty bodies extracted from hair are for the most part composed of oleïne, margarine and margaric acid. M. Van Laer had already arrived at an identical result; however, M. Von Bibra found, only once, it is true, cerebric acid, or at least an analogous matter; this was with woman's hair, which had fallen off spontaneously; this acid was, indeed, insoluble in cold ether, and, moreover, it contained nitrogen.—*Chemist, Sept.* 1856, *from Annalen der Chemie und Pharmacie.*

ON DECOLORIZING CHARCOALS, AND THEIR POWER OF ABSORBING SOME OF THE GASES.

By John Stenhouse, LL.D., F. R. S.

The singular property which vegetable charcoal possesses of removing odors and colorizing matters from solutions, was first observed by Löwitz towards the close of the last century. In 1811, Professor Figuier, of Montpellier, ascertained that animal charcoal or bone-black, as it is called, was immensely more efficacious as a decolorizer than any of the ordinary kinds of vegetable charcoal. M. Figuier's discovery was speedily confirmed by numerous other experimenters, and soon afterwards applied to the refining of sugar, for which bone-black has ever since formed one of the most important reagents.

The way, however, in which charcoal acts as a decolorizer, remained involved in considerable obscurity till 1822, when three prize essays on the subject were published by MM. Bussy, Payen, and Desfosses. M. Bussy's memoir was particularly valuable, and threw much light on the subject. Those of Payen and Desfosses, though less systematic and practical than M. Bussy's memoir, agreed with it in its general conclusions. These were

chiefly that the decolorizing power of the charcoal, though inherent in the charcoal itself, is entirely dependent on its physical state, especially on its extreme porosity and minute state of division. Thus, charcoal which has been strongly heated so as to become hard and lustrous by undergoing a species of fusion, scarcely exhibits any decolorizing power. On the other hand, charcoal, such as bone-black, which contains much saline and earthy matter, such as phosphate of lime, &c., as its particles are prevented from agglutinating, yields a dull non-lustrous material, possessing very considerable decolorizing power. Bussy found also that the distinction which had previously been drawn between vegetable and animal charcoals as decolorizers, was erroneous, and that charcoals, whether of animal or vegetable origin, should be divided into two classes, compact and lustrous, and porous and non-lustrous.

Till of late only two species of decolorizing charcoal have been employed in the arts. First. Bone or ivory black, made by calcining bones in close cylinders till the organic matter they contain is entirely carbonized. This is by far the most common of all the decolorizing charcoals, and is the only one employed in sugar-refining, and for decolorizing similar neutral solutions. It usually contains little more than 10 per cent. of carbon, and about 90 per cent. of phosphate and carbonate of lime. The second species of decolorizing charcoal is the so-called purified animal charcoal, which is made by digesting bone-black in hydrochloric acid, and edulcoration with water till all the lime-salts are removed. Purified animal charcoal, when carefully prepared, may be regarded as nearly pure charcoal, which has a dull lustrous appearance, and is extremely porous, provided that, after purification, it has been dried at a temperature little exceeding 212°. It decolorizes neutral and acid solutions exceedingly well; but, after being heated to redness, its texture becomes compact, and its decolorizing power is almost entirely destroyed. A second process for purified animal charcoal consists in intimately mixing blood or the fleshy parts of animals with pearlashes, and then calcining them in close vessels. The alkaline salt is first washed out with pure water, and then the last traces of the potash and lime-salts are removed by digestion with hydrochloric acid. The purified animal charcoal obtained

in this way is even more efficacious than that produced from bone-black. Such, then, was the state of our knowledge in regard to decolorizing charcoals till about eighteen months ago, when I first directed my attention to the matter.

As the cost of purified animal charcoal—about two shillings per pound—is very considerable, I was induced to procure an economical substitute for it, which could also be employed in acid solutions. This I effected by combining alumina with ordinary vegetable charcoal. The following is the process employed. Fifty-four parts of the sulphate of alumina of commerce, which is made by digesting the purest kinds of pipe-clay in pretty concentrated sulphuric acid, and which usually contains about 14 per cent. of alumina, were dissolved in water, and digested with 92½ parts of finely-powdered ordinary wood charcoal. When the charcoal had been thoroughly saturated with the solution of sulphate of alumina, the mass was evaporated to dryness. It was then introduced into covered Hessian crucibles, or large muffles, and was heated to redness till all the water and acid had been dissipated. In this way a decolorizing charcoal was obtained, which, though it still appeared perfectly black, was thoroughly impregnated with anhydrous alumina. When sulphate of alumina and charcoal were employed in these proportions, a decolorizing charcoal was obtained, containing almost exactly seven and a half per cent. of alumina, which is the quantity of alumina which I have found, after various trials, to be the most effective, as it appears to be exactly the amount requisite thoroughly to coat all the cells of the charcoal; for, on increasing the quantity of alumina above seven and a half per cent., the charcoal did not gain any additional decolorizing power; and on diminishing the amount of alumina below seven and a half per cent., the decolorizing power of the charcoal was also diminished. After calcination in the way described, on being again carefully pounded, the aluminized charcoal was ready for use. A more economical method of preparing aluminized charcoal is, instead of employing dried sulphate of alumina to prepare a solution of sulphate of alumina of known strength, by simply digesting calcined pipe-clay in pretty concentrated sulphuric acid. Such an amount of the solution is to be employed as shall impregnate the charcoal with seven and a half per cent. of

alumina. In preparing sulphate of alumina, the chief point to be attended to is to employ a clay as free from iron and lime as possible, though the presence of a trace of iron is quite immaterial. A clay containing a considerable quantity of lime may likewise be made available, by previously removing the lime by digestion with hydrochloric acid. The charcoal, which is now produced in large quantity by the destructive distillation of of sawdust for pyroligneous acid by Halliday's patent process, being almost a waste product, is exceedingly well adapted for aluminizing.

The aluminized charcoal may be employed to decolorize all acid solutions except those containing much free sulphuric acid; for, after being heated to redness, the alumina becomes so compact, that it is not soluble in any but pretty concentrated sulphuric acid. Aluminized charcoal decolorizes tartaric and citric acids quite as efficiently as either bone-black or washed animal charcoal, *i. e.*, bone-black digested for some time with hydrochloric acid, while it is much cheaper than washed animal charcoal, and does not introduce nearly so much inorganic matter into the tartaric acid mother liquors. The price at which aluminized charcoal can be produced does not exceed that of bone-black. The only two points required to be attended to, with regard to alumnized charcoal, are to employ it in very fine powder, and to boil it for a few minutes with the solution it is wished to decolorize.

I have repeatedly decolorized solutions of crude tartaric and citric acids with aluminized charcoal, and have invariably found that the aluminized charcoal possessed an equal decolorizing power with washed animal charcoal—the material usually employed by tartaric acid manufacturers. I likewise found that the aluminized charcoal introduced a very small quantity indeed of inorganic matter into the mother liquors, compared with that which always results from the employment of either washed animal charcoal or bone-black, as may be seen by the subjoined experiments. Equal quantities of crude tartaric acid were decolorized with the same amounts of bone-black, washed animal charcoal, and aluminized charcoal. When the resulting solutions were evaporated to dryness, they yielded, on incineration, the following quantities of fixed residue:—

Aluminized charcoal	0.32 per cent.
Ivory black	7.58 " "
Washed ivory black	3.40 " "

It is evident, therefore, that aluminized charcoal is especially well adapted for the decolorizing crude tartaric and citric acids, as it introduces such a very small quantity of inorganic matter into the mother liquors. And, doubtless, it is owing to their employing washed animal charcoal, and sometimes even bone-black, that the tartaric acid manufacturers find their mother liquors so intractable from the large quantity of inorganic salts they contain.

An artificial bone-black may likewise be produced by impregnating powdered wood charcoal with basic phosphate of lime, dissolved in an excess of hydrochloric acid, so as to impregnate the charcoal with seven and a half per cent. of bone earth instead of eighty per cent. as in ordinary animal charcoal. It is manufactured by a precisely similar process to that already described, the acid and water being driven off by ignition in close vessels. It decolorizes very well, but can only be employed in neutral solutions. It is evident that both aluminized and artificial phosphate of lime charcoals, just described, are merely mordaunted charcoals, which decolorize solely by the bases or mordaunts which they contain.

Besides the aluminized charcoal, I have also prepared an additional substitute for purified animal charcoal, by means of hydrate of lime and a mixture of coal-tar pitch and coal-tar. The following is the process employed for this purpose. I take one pound by weight of coal-tar pitch, and gently heat it in an iron pot till it melts. I then add two pounds of fluid coal-tar, and mix the liquids. Seven pounds of hydrate of lime in very fine powder are next gradually stirred into the mass, which soon becomes thick and pasty. It is then gently roasted, the stirring being continued during the whole time till it is reduced to the state of a very fine powder. The great object of the stirring and roasting being to incorporate the lime with the vegetable matter as intimately as possible. The dark brown powder obtained in this way is then introduced into ordinary covered crucibles or iron retorts, and is ignited, until the whole of the vegetable matter is entirely carbonized. The mixture when cold is then

digested with dilute hydrochloric acid, thrown upon a filter, and finally washed with distilled water till everything soluble is removed. In this way an extremely porous, very light, nearly pure charcoal is obtained, which for some purposes, such, for instance, as decolorizing logwood and similar solutions, is four times as effective as the most carefully prepared purified animal charcoal. It likewise decolorizes impure gallic acid solutions admirably. This charcoal from coal-tar may likewise be prepared with much weaker hydrochloric acid than is required to remove the phosphate of lime from bone-black. Quick-lime in fine powder may likewise be employed instead of hydrate of lime, and also calcined magnesia and the light sub-carbonate of magnesia of the shops, but chalk, even when finely powdered, answers very badly indeed.

Instead of coal-tar and coal-tar pitch, some other vegetable substances, such as maize, wheat, and the various kinds of flour, common resin or colophonium, pitch, wood-tar, or bitumen, may be employed. When flour, resin, &c., are intimately mixed with carbonate of potash and calcined in close vessels, very good decolorizing charcoals are obtained, but I was surprised to find that carbonate of soda, either hydrated or dried, did not produce a similar result.

As was first observed by Messrs. Bussy and Payen, I find that every species of decolorizing charcoal acts with varying efficiency on each colored solution to which it is applied. Thus, for instance, one charcoal decolorizes a solution of indigo better than it does one of logwood, syrup, or tartaric acid, while another charcoal will decolorize a solution of logwood more readily than one of molasses; and so of others.

As the result of this investigation, I think that decolorizing charcoals may be very properly divided into three classes: First, into those which, like the purified and the coal-tar charcoals, above described, may be regarded as merely pure charcoals in an extremely minute state of division, and which decolorize by their porosity alone. Second, into those mordaunted charcoals which, like aluminized charcoal, and artificial phosphate of lime charcoal, decolorizes solely by the mordaunts or bases which they contain. Third, into bone-black, which is a composite charcoal, and decolorizes, partly, by the large quantity of phosphate of lime, and partly by the ten per cent. of minutely divided charcoal which it contains.

The propriety of this classification may be made very plain by a simple experiment. If equal quantities of purified animal or coal-tar charcoal, aluminized charcoal, and bone-black, are boiled in decoctions of logwood till they are saturated with coloring matter, and if they are then thrown upon filters, which are washed with dilute solutions of aqua ammonia, the ammoniacal solution from the aluminized charcoal will be of a straw, yellow color; that from the bone-black will be somewhat deeper; while those from the purified animal and coal-tar charcoals will be nearly as deep as ink. This evidently shows, that in the case of the aluminized charcoal, the coloring matter was in true chemical combination with the alumina. In the bone-black, this was also partially the case, while in the purified animal charcoal, no true chemical combination had been formed, but the coloring matter was merely retained by the porosity of the charcoal.

I shall conclude this paper by shortly noticing some experiments on the power which the various decolorizing charcoals possess of absorbing three of the gases, viz., ammonia, carbonic and hydrochloric acids. Their results, which are somewhat anomalous, I have thrown into the subjoined tabular form. A gramme of each charcoal was employed. All the charcoals were decolorizers, except the platinized charcoal, which, as it consists of common wood charcoal, impregnated with a small quantity of metallic platinum, of course possesses no affinity for coloring matters.

Cubic centimetres of Gases absorbed by one gramme of various kinds of Charcoals.

NAME OF CHARCOAL.	NAME OF GAS.		
	Ammonia.	Carbonic acid.	Hydrochloric acid.
Common Wood.....	145	15	158.7
Common Animal.....	105	2.5	Not tried.
Purified Animal.....	210	No Absorption.	185
7½ per cent. Aluminized.....	212.5	12.5	177.5
7½ per cent. Phosphate of Lime	152.5	10	Not tried.
Pure Coal-tar Charcoal.....	335	No absorption.	130
5 per cent. Platinized.....	142.5	No absorption.	135

In connexion with the absorbent power of charcoal for gases, I may mention that the charcoal air-filters, respirators, and

bandages for putrid wounds, described by me in a former paper nearly three years ago, are now coming into very general use.—*London Pharm. Journ. Jan.* 1, 1859.

ON EXTRACT OF LIQUORICE.

By M. A. Délondre.

In the Journal de Pharmacie for December, there will be found a long report by Messrs. Hottot, Deschamps & Dublanc, on a note by M. Délondre on the preparation of extract of liquorice. It has often been asked why is there so large an amount of insoluble matter in even the best Calabria liquorice; and it had not been satisfactorily shown whether this is the result of the treatment of the root, or whether foreign substances are added, perhaps less with the view of adulteration than of giving the extractive matter that consistence requisite to form it into rolls.

The process indicated by M. Délondre consisted simply in treating liquorice root by displacement with hot water, and rapidly evaporating the infusion to the consistence proper for making rolls. The commission, in carrying this process into practice, were not able to arrive at the same result. In the comparison of M. Délondre's extract with their own and the commercial product, they tried their solubility in cold water, noting the rapidity of the process, the specific gravity of the solution, its spumosity, the weight left undissolved by a specified quantity of water, and the amount precipitated when alcohol was added in excess to such solutions.

The extract of liquorice made by the committee by Délondre's process was dry and shining, but softened by exposure to the air for a few days whilst the temperature was 77° to 86° Fahr., and lost its shape. Its taste is less agreeable than the commercial article, or that made by M. Délondre himself. The solution of the extract in cold water left 10 per cent. of insoluble residue, and the clear solution mixed with an excess of alcohol 95° caused 15 per cent. of matter to separate; in all 25 per cent. The liquorice prepared by M. Délondre did not lose its shape by exposure; its fracture was smooth and conchoidal; its taste less acrid than that made by the committee, though not as agreeable

as some of the commercial varieties. It contains 18·6 of matter insoluble in cold water; and an excess of alcohol precipitated 27·2 per cent. of matter from the watery solution; in all 45·7 per cent. of the weight of the extract.

The committee being at a loss to reconcile these results with the alleged purity of M. Délondre's extract, wrote to him an account of their labors, when he maintained his previous assertion, could not give the rationale, but proposed to join the committee in clearing up the difficulty, which he did by frankly explaining the modus operandi of his process. It is as follows:—

M. Délondre puts in a suitable vessel, 260 kilogrammes (573 lbs.) of liquorice root in coarse powder, and admits a current of steam during twelve hours. In this way the fibres of the wood are thoroughly penetrated and acted on, and the resulting condensed liquid drawn off. This treatment is renewed for five successive days, the several liquids are decanted, clarified with two kilogrammes (4·4 lbs.) of gelatine, and rapidly evaporated in jacketted boilers. The extract is removed, made into rolls, and put into a drying room kept at 77° Fahr. for ten days.

This explanation from the author of the process at once showed the cause of the difference, viz.: that the continued action of steam was capable of extracting principles insoluble in warm water.

To fully satisfy themselves, the committee requested M. Délondre to make four experiments:—

1st. To prepare an extract with cold water by displacement.

2d. To treat the residue with hot water.

3d. To treat the second residue by steaming.

4th. And to make an extract by his own process, direct from the root.

These several products were then examined by the committee.

1. The first extract amounted to 15 per cent. of the root treated; was soluble in its own weight of water, except 4·22 per cent., and when dissolved in 1000 times its weight of water, the solution had a decided liquorice taste. 100 parts dissolved in water yielded a precipitate of 36 parts by adding an excess of alcohol.

2. The second treatment yielded 7·5 per cent. of extract. The extract was hygroscopic; had a taste nearly as strong as the pre-

ceding; dissolves more slowly in water, of which it requires twice its weight for solution, with a residue of 4·7 per cent. Diluted with 1000 parts of water its taste and color are less marked than the first extract, and its strong aqueous solution, treated with alcohol 27·8 per cent., was precipitated.

3. The third extract, by steam, obtained from the woody residue of the two preceding extracts having been removed, amounted to 16 per cent. It was dry, hard, friable and nearly pulverulent. Its taste is sweet, without acrimony, and remains a long time in the mouth without dissolving. Put in cold water a portion dissolves, and an abundance of insoluble matter floats on the solution, amounting to 57 per cent. Dissolved in 1000 parts of water the solution has no characteristics of liquorice, and a solution of the soluble matter yields 18·4 per cent. when precipitated with alcohol.

4. Liquorice root treated by M. Délondre's method, yields from 42 to 45 per cent. of extract in rolls. The extract is a shining black, smooth fracture, firm consistence, not softened when exposed to the air, and similar in its general relations to the best extract of commerce. Its taste is more decided, due to its greater purity. Dissolved in 1000 parts of water, a sweet colored solution is afforded, and alcohol precipitates from its concentrated solution 27.4 per cent. of matter.

The committee conclude their remarks by a favorable opinion of the process of M. Délondre, believing that it is necessary, in order to have a permanent extract to retain in it the insoluble matter taken up by the steam, however desirable it may be for pharmaceutical purposes to employ the pure soluble extract obtained by infusion.

ON PENGHAWAR DJAMBI, A NEW STYPTIC.

By Daniel Hanbury.

A small package of the curious drug, known by the name of *Penghawar Djambi*, or by the not less barbarous designation *Pakoe Kidang*, was lately offered at one of the public drug sales in the city.

The drug consists of the lower part of the stalk or *stipes* of a large fern, native of the island of Sumatra. The stalks as im-

ported are in straight pieces, about a foot in length and an inch in width. They have mostly been split open lengthwise, perhaps to facilitate their drying. Their most striking feature, however, is the abundant clothing of long, sparkling, golden-brown, moniliform hairs, with which the outer part of the stipes is thickly covered, and which at the first glance suggests for the drug an animal rather than a vegetable origin.

Penghawar Djambi, though new to the English drug market, has for some years past been in the hands of the pharmaceutists of Holland and Germany, and now has even a place in the Dutch pharmacopœia.*

The plant which affords it, is without doubt, of the genus *Cibotium*. Dr. Oudemans, in his Commentaries on the *Pharmacopœia Neerlandica*,† refers it to *C. Cumingii* Kunze, a fern of the Phillippine Islands, regarded by one of our best filicologists as not specifically distinct from the *C. Barometz* of J. Smith. On this point Mr. John Smith has been kind enough to reply to some inquiries I recently addressed to him, in a communication from which I extract the following:—

"I may safely say that that the hairy stipes called *Penghawar Jambie* are produced by a species of *Cibotium*. Of this genus, six species are described in Sir W. Hooker's *Species Filicum*,‡ viz: *C. glaucescens* Kze. (*Polypodium Barometz* L., *Cibotium Barometz* J. Sm.) and *C. Assamicum* Hook., from the Eastern hemisphere; *C. Sheidei* Schlecht. et Cham. from Mexico; and *C. glaucum* (*Dicksonia glauca* Smith, in Rees's *Cyclop.*), *C. Chamdissoi* Kaulf. and *C. Menziesii* Hook., from the Sandwich Islands. All are characterized by having the rhizome or caudex and the base of the stipes densely covered with soft moniliform hairs. In the Eastern species, the rhizome is decumbent, and upon removal from the ground, might easily be formed by a little artful manipulation, into the fabulous *Vegetable Lamb* or *Barometz*. The plant which affords this production, was referred by Linnæus from Loureiro's description, to the genus *Polypodium*, and called *P. Barometz*. Nothing further was known of it till about thirty years ago, when the late John Reeves, Esq., sent a living plant from China to to the nursery of Messrs. Loddiges at Hackney, as the true *Barometz*. This plant increased and in time became an inhabitant of other gar-

* Pharmacopœia Neerlandica, 1851, p. 53.

† Aanteekeningen op het Botanische, Zoologische en Pharmacognostische Gedeelte der Pharmacopœia Neerlandica. Door C. A. J. A. Oudemans, M. D. Rotterdam, 1854, 1. Afl. p. 17.

‡ Page 82.

dens; it was not, however, till 1840, that it produced fructification, which it did in the Birmingham Botanic Gardens, a notice of which is recorded in the *Proceedings of the Linnean Society* for February, 1840. I then identified it as belonging to the genus *Cibotium* of Kaulfuss, and in my *Genera Filicum*, published in 1841, I recorded it under the name of *Cibotium Barometz*.

"In the Berlin garden it received the name of *C. glaucophyllum*, afterwards changed to *C. glaucescens* by Kunze, who figured it in Schukhr's *Supplement*, p. 63, t. 31. Since then (1846) dried specimens collected by Fortune and by Seemann, and corresponding with the living plant, have been received from China.

"Now for the name *Cibotium Cumingii*.—In 1840, Cuming brought specimens of a *Cibotium* from the Philippines, which in my enumeration of the ferns of those islands I named *Cibotium glaucum*,* then believing it to be the *Dicksonia glauca* of Dr. J. E. Smith (Rees's *Cyclop.*, vol. xi). Kunze, however, considered it a distinct species and named it *C. Cumingii*.

"After much examination of well authenticated specimens, I have come to the conclusion that *C. Barometz* J. Sm., *C. glaucescens* Kunze, *C. Cumingii* Kunze and *C. Assimicum* Hook., constitute *one* species only. I therefore retain the original historical name of *C. Barometz*, for the eastern type of the genus.

"It appears that the stipes called *Penghawar Djambi* comes from Sumatra. Although I have not seen any fronds of *Cibotium* from that locality, still, judging from the stipes in question, I see no reason to doubt the correctness of referring it to *Cibotium Cumingii*, which as above stated, I regard as not different from *C. Barometz*."

The authors of the *Pharmacopœia Neerlandica* quote *Agnus Scythicus* as synonymous with the Sumatran *Penghawar Djambi*, in which it is evident Mr. John Smith thinks them correct. They do not, however, attempt to fix the botanical origin of the drug, but merely refer it to "Filicis species nondum satis cognita."

Professor Miquel, on the other hand, while referring *Penghawar* to *C. Cumingii* Kunze questions its identity with *Agnus Scythicus* in these words:—"*Agnus Scythicus* seu *Barometz pharm.*, filicis etiam caudex est sed ab eo Cibotorum diversus."†

Having examined an ancient specimen of the so-called *Scythian Lamb* preserved in the British Museum,‡ as well as a living

* Journ. of Bot., vol. iii. (1841), p. 418.

† Analecta Botanica Indica, ii., 36.

‡ Probably the same specimen as is excellently figured in Rymsdyk's Museum Britannicum, London, 1791, fol. Tab. xv., fig. 2.

plant of *Cibotium Barometz* J. Sm., I must confess I find them far more to resemble each other than they do the Sumatran *Penghawar*. It must, however, be borne in mind that a plant having a range so extensive as to embrace Assam, China, the Philippines and the Islands of the Indian Archipelago, may be expected to vary considerably according to the soil, the situation, and the degree of moisture and heat in which it may grow, so that I am far from impugning the correctness of referring both productions to one and the same plant.

* * * * * * * * * *

Before dismissing *Penghawar Djambi*, we must, however, consider its reputed medicinal and surgical uses. As a styptic, the hair of the stypes may be employed in the same manner as cotton wool, tow, or the nap of a beaver hat. According to Dr. J. M. Van Bemmelen, who has elaborately investigated the chemistry of the drug,* the styptic action of these hairs is solely mechanical. Practitioners have tried the effect of an aqueous decoction of the hairs or of the stem, as a remedy for internal hæmorrhage, and some have reported favorably of it.† The experiments of Dr. Van Bemmelen leave little ground for placing any reliance on the reputed good effects of the drug so applied; and I fully concur in that writer's conclusions, as expressed in terms which I translate thus:—

"I therefore believe myself justified in the opinion that it is highly improbable that that which water extracts from this plant is an active remedy for internal hæmorrhages. There appears to me no grounds whatever, either from a chemical or physiological point of view, for presuming that we may expect any good result in practice from the employment of such a preparation." —*Pharm. Jour.*, Nov. 1856.

* Chemische Untersuchung des Penghawar Djambi in Vierteljahresschrift für prakt Pharmacie V. bd., 3 heft (1856).

† Since the above was in type, I have heard from my friend, Dr. J. E. De Vry, of Rotterdam, that the late Dr. Molkenboer, a talented Dutch physician, was firmly of the opinion that a decoction of *Penghawar Djambi* was beneficial in internal hæmorrhage.

PROCESS OF PRESERVING PLANTS IN THEIR ORDINARY FORM AND WITH THE BRILLIANCY OF THEIR FLOWERS.

By. MM. Reveil, Prof. to the School of Pharmacy of Paris, and Berjot, Pharmacien at Caen.

It has long been a desideratum to preserve plants in such a way as to retain their natural form and appearance. Processes having this object have long since been described. We will take a rapid view of these processes, before describing that which we propose, and which we have always found successful.

In 1770, M. Quer, a Spaniard, presented to the Academy of Bologna a collection of plants, dried with care and very elegant; but in the process indicated the leaves and branches were detached, and dried separately between leaves of paper in the sun, or in a gently heated oven. The flowers retained their lustre and their form, if the desiccation was very rapid, and if very little pressure was employed; then the leaves and branches were again gummed on to the principal stem. It is easy to understand that this process must be very long, and that, moreover, it was difficult and even impossible to restore the leaves and branches to their natural position. M. Monty, who described this process in the *Observations sur la Physique et sur l'Histoire Naturelle*, 1772, page 623, ascertained that the temperature of the human body is the most suitable for this desiccation; it was by this means that he was enabled to preserve tulips, anemones, ranunculus, &c.

The celebrated anatomist, Ruisch, gives in his work entitled *Premier Tresor*, various processes for the preservation of animal matters, some of which may be applied to plants.

But it is especially to Monty that we owe the most interesting researches. We insert them here with so much the more pleasure, as his observations completely agree with our own; we did not know his works when we commenced our experiments; if we had known them some months ago, we should have been spared much trouble and many experiments.

M. Monty endeavored, in 1772, to preserve the plants without subjecting them to the least pressure; several attempts had been made in this direction; but fruitlessly. He first tried desiccation in millet seed; but he saw that by this means the flowers and leaves were wrinkled, and moreover, they retained the im-

pression of the millet seeds. He afterwards tried, with no greater success, millet deprived of its pericarp; rice and corn did not give any good result; every vegetable substance was rejected, because it took the moisture from the plants, and the desiccation was badly and slowly effected.

M. Monty then tried yellow river sand; he was obliged to give it up because the plants retained the sand. He was induced to make use of the white sand, known by the name of freestone (the sand of Etampes answers very well for this operation). After having sifted this sand in order to separate the coarser particles, he separated the finest particles by levigation, dried the sand and used it for enveloping the plants in boxes, which he afterwards exposed to the sun or to the heat of a baker's oven. The experiment succeeded very well; afterwards, Monty used sea-sand, which gave less satisfactory results.

Ten years ago, M. Stanislas Martin proposed, under the name of *embalment of plants*, a process of preservation, in which he likewise employed dry sand, but without pointing out the precautions to be taken, and without which the operation could not succeed.

Every one noticed at the Universal Exposition the magnificent flowers prepared by M. Keutz Swartz. We had an idea, at this time, to investigate the means by which these plants had been preserved. One of us possessing an apparatus in which a vacuum may easily be made, we tried desiccation out of contact with the air and at a low pressure, without obtaining very satisfactory results; we likewise tried the process by ventilation, which dries rapidly and perfectly preserves the color, but which has the serious inconvenience of deforming the corolla and mutilating the leaves; all the organs of plants become extremely friable by desiccation; thus ventilation had to be abandoned.

We then tried dry sand, and without being aware of M. Monty's experiments, we were led by degrees to introduce into the process the modifications which he had recommended as indispensable; that is to say, the selection of the sand in small equal grains, and washing it to remove the dust; but, in our opinion, these precautions are still insufficient, and after numerous trials, we have stopped at the following process:—

We take white sand in equal grains, which we pass through a

hair sieve, it is washed with a large quantity of water in order to remove the finer particles, and the washing is continued until the water goes perfectly limpid. The sand is then dried in the sun or in an oven, or, which is better still, it is raised to about 150° C. (302° F.), being kept constantly agitated in a basin. We then pour in for 25 kilogrammes of sand, a mixture of 20 grammes of stearic acid, and 20 grammes of spermaceti; it is mixed and bruised with the hand so as to cover every grain of sand with some of the grease.

We then put a layer of this sand into a box of any length and width, but of the height of about 12 centimetres (nearly five inches); the bottom of this box is let in by means of a groove, and should be capable of being easily removed. On the bottom is a grating of iron wire of very large mesh. The layer of sand being well established the plants are arranged in it, taking care to open the leaves and to mould the corolla in sand which is added with great care, the plants are covered with sand, and it is best to keep to this unique layer; we take care to put the least possible quantity of sand on the leaves and stems; we cover the box with a sheet of paper, and carry to a drying stove, or an oven heated to from 40° to 45° C. (104° to 113° F.); the desiccation proceeds very rapidly; when it is supposed to be finished, the bottom of the box is removed; the sand passes through the iron grating, and the plants remain; they are brushed with a badger hair-brush, and are kept as we shall presently direct.

The greased sand adheres very slightly to the plants, and it is always easy to remove it; it is often sufficient to give gentle blows for all the sand to fall, provided, however, that the plants have not been collected while still moist; we have likewise remarked, that it is better to collect them before the anthesis is completely operated; it may be finished by steeping the plant by its base into a small quantity of water; for rather fleshy plants, the vacuum singularly hastens desiccation.

However, we must add that sand, whether greased or not, cannot be employed for preserving plants which are covered with a viscid varnish, the hyoscyamus, for example; in this case it is absolutely necessary to use millet seed or rice, as Monty did.

We may, indeed, make two layers of plants; but it is not prudent to exceed that number. The box with a moveable bot-

tom, has rendered great services; in using an ordinary case, there is great danger of injuring the plants in removing them from the sand.

The brilliancy of the plants is quite retained by his process; white flowers even preserve their dead whiteness; it might have been feared that it would have been otherwise, since the white is the interposition of the air; yellow and blue flowers are preserved very well; but violet and red colors turn slightly deeper.

The dried plant, left in contact with the air, resumes a little moisture and withers; to preserve it, it is placed in bottles, at the bottom of which is put some quick lime enclosed in Japan paper and covered with moss; the bottle is hermetically sealed with a disc of glass, which is caused to adhere by means of a mastic of gum-lac, or caoutchouc.

This process of preserving plants may be of service for drying some flowers or plants used in medicine, such as the violet, the mallow, the stems of melissa, mint, hemlock, &c. The odor is very perfectly preserved and often increased, but it is especially for the preservation of plants intended for the Schools of Pharmacy and Medicine and for the Colleges, that this process may be useful; it will likewise render great services to horticulturists who desire to preserve rare flowers, as well as to travelling naturalists, who will thus be able to bring home their plants with their natural appearance, which will render determinations more easy.—*London Chemist, October*, 1856, *from Journal de Pharmacie, August*, 1856.

ADVANTAGEOUS PROCESS FOR THE PREPARATION OF LITHIA FROM LEPIDOLITE.

By Karl Von Hauer.

Finely pounded lepidolite was well mixed with about half its weight of sulphate of lime, and exposed for two hours in a Hessian crucible to a red heat. On cooling, the mass, which was firmly caked together, but not fused, was lixiviated with hot water, and the solution separated from the insoluble residue by decantation. The solution contained nearly the whole of the potash, lithia and manganese contained in the lepidolite, converted into sulphates by the sulphate of lime. The solution also con-

tained a small quantity of alumina, and the proportion of sulphate of lime soluble in water.

The solution was evaporated to as small a volume as possible, as sulphate of lithia is very soluble in water. By this means a considerable portion of the much less soluble sulphate of potash crystallized out, as did also nearly all the sulphate of lime. The filtered fluid was mixed with ammonia, a little sulphuret of ammonium, and oxalate of ammonia. The precipitate thus produced, consisting of alumina, sulphuret of manganese and oxalate of lime, was separated, and all the lithia was then thrown down as carbonate, by means of carbonate of ammonia, assisted by heat, and washed with cold water. To purify it completely from potash, it is well to repeat the last operation once more, by dissolving the carbonate of lithia in an acid, and precipitating it again by carbonate of ammonia.—*Chem. Gazette, Oct.* 15, 1856, *from Journ. für Prakt. Chem.*

ON THE PREPARATION OF CHEMICALLY PURE SULPHURIC ACID.

By F. Vorwerk.

Some time ago Russegger described a method in which, by a particular arrangement of the retorts, sulphuric acid may be distilled by boiling without thumping, and the rectification of the crude acid may be effected without the employment of platinum wire. Instead of this the author recommends the following process, which fulfils the same purpose, and dispenses with all further particular arrangements.

Into a long-necked plain retort, which had already served several times for the preparation of nitric acid, 5 lbs. of slightly brown English sulphuric acid, of spec. grav. 1·832 and free from arsenic, were put. The retort was put upon a layer of sand of the depth of a finger in the sand-bath, and surrounded with sand, so that it was buried up to the neck. A long-necked flask served as a receiver; it was simply pushed over the neck of the retort without any luting. Commencing with a moderate heat, this was gradually raised until the sand-bath became red-hot, during which the distillation went on quite regularly without any thumping. Notwithstanding the heat to which the retort was

exposed, the receiver did not require to be cooled until after six hours' working, and even then only by wrapping a wet cloth round the neck. The distillate was removed from time to time, and tested as to its purity and specific gravity. The first 5 oz. that passed had a specific gravity of 1·20, and exhibited no impurity except a considerable quantity of sulphurous acid. The second portion of 3½ oz. of distillate, with a specific gravity of 1·75, still contained a trace of sulphurous acid. A third portion of 2½ oz. was pure, and had a specific gravity of 1·850.

Fourth portion of	1½	lb.	spec. grav. 1·855
Fifth portion of	13	oz.	spec. grav. 1·860
Sixth portion of	9	oz.	spec. grav. 1·885

With this the distillation was concluded, to enable the contents of the retort to be examined. The uninjured retort contained the remainder of the sulphuric acid as a simple fluid with a white sediment (persulphate of iron,) from which no doubt ½ lb. of pure distillate might still have been obtained.

In such distillation, particular attention is to be paid to the quality of the retort. It is always advisable to anneal the retort before using it, by heating it as strongly as possible in the sand bath, and letting it cool slowly and completely therein.—*Chem. Gaz., Nov.* 15, 1856, *from Neues Jahrbuchr für. Pharm.*

ON THE PREPARATION OF DRYING OIL.

By Prof. R. Wagner.

The author repeatedly prepared protoborate of manganese for lacquerers, in accordance with the directions of Barruel and Jean. He effected its precipitation whilst hot, and thus obtained it of a coffee-brown color, and consequently containing much oxide, but still always of remarkable efficacy. As, however, Barruel and Jean expressly observe that the action is proper to the protosalts, the author endeavored to obtain it perfectly free from oxide, and for this purpose effected the precipitation with borax cold. He obtained a snow-white powder, but this furnished no varnish. He therefore returned to the previous mode of preparation with the assistance of heat, and found that it was obtained of the darkest brown, and also of the strongest action,

when both the solutions of sulphate of manganese and borax were diluted as much as possible and mixed boiling. The siccative action upon the oil must therefore be ascribed to the oxide, and not to the protoxide.

By further experiments the author found that the boracic acid is quite superfluous, and that free oxide of manganese or its hydrate is as efficacious as the borate. The oil need only be heated for a very short time (about a quarter of an hour) with about one-eighth per cent. of oxide or hydrated oxide of manganese. The heat applied, need not approach the boiling-point by a long way; but no general temperature can be given, as new oil has a much higher boiling-point than old. The siccative quality, however, increases with the heat. But as the oil becomes darker and thicker in proportion to the heat to which it is exposed, it is the best plan in general to remove it from the fire as soon as it clears and begins to fume very slightly. Streaks of it now become firm in twenty-four hours. To obtain the drying oil of a very pale color, it must be heated still less. The drying is thus retarded several hours, but the color has scarcely become perceptibly brownish, whilst in the former case it always acquires a chestnut-brown color.

The author obtained a wine-yellow oil, quite unaltered, without heat, by mixing 1 per cent. of hydrated lime with a linseed-oil four years old, which dried by itself in three days. After being frequently stirred for two days, a streak of it was perfectly firm in twenty-four hours. Oil of the same year, however, did not become siccative even by boiling with lime.

The oil dissolves very little of the small quantity of oxide of manganese, and the salt, when removed, may be repeatedly used in the preparation of drying oil. When prepared oil is mixed with an equal weight of crude oil, it requires nearly twice as long to dry; with twice the quantity, twenty hours longer; and with three times the quantity, another twelve hours; but the time necessary for the solidification of the coating, gradually diminishes a little by long standing.—*Chem. Gaz., Nov.* 15, 1856, *from Kunst-und Gewerbeblatt, für Bayern.*

NOTE ON A PRODUCTION OF SULPHURET OF IRON.

By M. Chevreul.

In a memoir which I read to the Academy in November, 1846, I examined the black ferruginous matter found under the pavements of Paris, and I arrived at the following conclusions:—

This matter proceeds from the horses' shoes, from the iron of the wheels of vehicles and from the *débris* of that metal which are scattered on the public way; it is carried into the gutters and between paving stones, and there it is converted into magnetic oxide of iron (FeO^2+Fe) and may afterwards pass to the state of sulphuret, likewise black.

So long as the matter remains black, it prevents the oxygen of the atmosphere, whether in the gaseous state, or dissolved in water, from penetrating into the layer of earth situated beneath it.

How is this sulphuret of iron produced?

Experiment has taught me:—

1. That mixtures of iron and gypsum; of iron, gypsum and white of egg; and of iron, gypsum and gum arabic, confined in flasks with water and air, had given only oxide of iron without sulphuret.

2. That protosulphuret of iron was produced under a pavement near Biévre, and in a place where there was water impregnated with organic matter and sulphate of lime, a portion of which had been converted into sulphuret.

I concluded from this double observation, that the sulphuret of iron which is found in the mud of Biévre, &c., results probably from the reaction of the oxide, or sesquioxide of iron, or the sulphuret of calcium, produced by the reaction of the organic matters on the sulphate of lime.

The object of the note which I now communicate to the Academy, is to convert this probability into certainty. I have now profited by the cleansing of Biévre to examine a black sandy mud, which was raised from the bottom of the river. On placing this mud on a filter, there passed off a yellow liquid, principally formed of a polysulphuret of calcium; it precipitated acetate of lead of a reddish-brown, and disengaged hydrosulphuric acid, depositing sulphur; it was sufficient to expose it to the air for it to become milky; finally, on agitating it with hydrated sesqui-

oxide of iron, it blackened this oxide, the water lost its sulphurous properties, and the black sulphuret treated with hydrochloric acid disengaged hydrosulphuric acid, leaving very finely divided sulphur undissolved.

I proved, besides, that the sand of the black mud, after having been washed with boiling water, and freed from all sulphuret of calcium, was colored by protosulphuret of iron, which disengaged hydrosulphuric acid when it was treated with hydrochloric acid.—*Chemist, Sept., from Comptes Rendus, July* 21, 1856.

ON THE TRANSFORMATIONS WHICH PROTOCHLORIDE OF MERCURY UNDERGOES UNDER THE INFLUENCE OF WATER, ALCOHOL AND HEAT.

By M. Berthe.

In this memoir the author arrives at the following conclusions :—

1. That under the influence of an elevation of temperature, and especially in contact with alcohol and water, the protochloride of mercury is decomposed, and gives rise to a certain quantity of bichloride.

2. That Smithson's battery, put in contact with calomel in suspension in water, gives rise to the same reaction, and that consequently, whenever we wish to free calomel from the bichloride which it may contain, or to detect the presence of this salt in it, we should employ the liquids, water, alcohol, or ether, only at the ordinary temperature; and that before resorting to the use of Smithson's battery, we should make sure of the perfect limpidness of the liquor.

3. Finally, in a physiological point of view, it may be deduced from these experiments that if a continued temperature of 40° to 50°C. (104° to 122° F.) is sufficient for causing the partial conversion of the protochloride of mercury into bichloride, it seems scarcely doubtful that this conversion is so much the more likely to be produced in the organism, when it is subjected to a temperature approaching that necessary for the transformation in presence of a relatively considerable quantity of alkaline chlorides. This is an additional proof in support of the opinion expressed by M. Mialhe, relative to the mode of action of this compound.—*Chemist. Sept., from Comptes Rendus, July* 21, 1856.

ON THE USE OF PLATINUM INSTEAD OF PORCELAIN OR GLASS IN MARSH'S METHOD OF DETECTING ARSENIC.

By Edmund Davy, F.R.S., M.R.I.A.. F.C.S.L., &c.

Professor of Agricultural Chemistry to the Royal Dublin Society.

Marsh's method, as is well known, is founded on the facility with which hydrogen gas, generated in the usual way, reduces arsenious or arsenic acid, if present, forming arseniuretted hydrogen, which being inflamed in contact with air, deposits on particular surfaces the arsenic, either in the state of metal or oxide, or a mixture of both, according to circumstances.

Porcelain or glass surfaces have been generally recommended by chemists. I have seen no mention made of platinum. On lately trying surfaces of this metal, it appeared to me to offer peculiar advantages, and to be decidedly superior to either porcelain or glass. In my first experiment I used a slip of thin platinum foil, but there was no deposition on it; the flame, though small, produced sufficient heat to carry off all the arsenic as arsenious acid; but on trying the blade of a platinum spatula, a spot of arsenic was at once deposited on its surface (closely resembling that produced by my electro-chemical method of detecting arsenic by the agency of zinc and muriatic acid on platinum.) A number of similar spots may be produced at pleasure, by holding the spatula for successive instants very near the orifice of the tube delivering the gas, the flame being small; then the spots of arsenic appear to be in the metallic state, or only partially oxidated, and they adhere strongly to the spatula; but if the spatula be held a little further from the orifice, then only arsenious acid will be deposited on it. The heat of a candle is sufficient to volatilise the arsenic as arsenious acid from the spatula, and this effect is accompanied by the alliaceous odor, even when the quantity of arsenic is less than one thousandth part of a grain.

In cases when antimony is present in solution under similar circumstances, antimoniuretted hydrogen is produced, the flame of which occasions the depositions of blackish spots of antimony, which are not removed by the flame of a candle.

The advantages of the platinum surface over porcelain or glass appear to be pretty obvious. The former is more manageable for subsequent experiments. The arsenic strongly adheres to

platinum, but weakly to glass or porcelain, from which surfaces it is easily removed by the finger. It is readily sublimed, producing the garlic-like odor. There is no ambiguity in the results; if antimony be present it remains fixed on the platinum. The apparatus I have employed is simple, a twelve ounce phial, with a mouth about an inch in diameter, having a tight cork, furnished with a funnel tube reaching nearly to its bottom, and a small tube drawn out to a point for the discharge of the gas. The zinc I employed was in the state of small lumps or in grains, and the sulphuric or muriatic acid very diluted, viz., one volume of acid to from 15 to 20, and even 25 volumes of water.—*Chemist, Oct.* 1856.

APPARATUS FOR TAKING SPECIFIC GRAVITY.

By Messrs. Eckfeldt and Dubois.

From Proceedings of American Philosophical Society.

The apparatus for taking specific gravity of solids, is essentially a tin cup with a spout at the side. Five vessels are here shown, of different sizes and shapes, to suit different cases. Four of these are cylindrical, raging from six to ten inches high, and from two to five inches in diameter. The tall one (ten inches by two), is intended for the trial of silver spoons and forks, or articles of similar shape; the others are adapted to lumps of stone or metal, or blocks of wood, of various sizes. The fifth vessel is rectangular, measuring 6½ inches high, 1¾ inches long, and ¼ inch broad, being intended for coins, not smaller than the half eagle or quarter dollar, and for small medals and gems of admissible size. This vessel is provided with a brass plate, as a *plunger*, for diminishing the surface. The smaller vessels are set firmly in mahogany blocks, to insure steadiness in the operation; and these blocks have screw feet, for convenience of levelling. The spouts extend upward, with a curve outward, the beak being far enough below the top of the cup to allow for the space to be taken up by the specimen, that it may not force the water over the top nor leave any point uncovered by water. The aperture of the spout is tapered to the one-sixteenth of an inch, and a small bit of wire projects downwards from the beak, to carry the drops of water properly. A small cup is placed directly under, to catch the water displaced, and a brass weight, equal

to the weight of this cup when empty, is found convenient (though not necessary) as a counter-weight.

When the operation is to be performed, suppose upon a gold or silver ore, the ore is first weighed, and afterwards its surface is moistened. The vessel is then nearly filled with water, and so much as is superfluous, or above the level of the beak of the spout, runs or drips off, to a final drop. The small cup is then set under the beak, and the lump is carefully lowered into the vessel by a hair wire or waxed thread. This, of course, displaces its own bulk of water, which runs off into the small cup, gradually coming back, to the former level, by a final drop. The weight of this water is the divisor, the weight of the lump the dividend, and the quotient is the specific gravity.

In connection with this apparatus, the following miscellaneous remarks are offered to the Society.

The opening of the gold mines of California brought out a great number of beautiful specimens of gold in the matrix (or mingled with quartz) of the most fanciful forms, and every variety of size and value. In many cases it was presumed, by the holders of these prizes, that they would bring more money, as curiosities, than as bullion; and at any rate, very many owners were unwilling to have such attractive specimens spoiled until they had been sufficiently exhibited. At the same time, it was always desirable to know, pretty nearly, how much gold was actually contained; and, to obtain such estimates, upon what was supposed to be reliable authority, many of these specimens were brought to the assay office of the mint. They came at a time when we were overpowered with the legitimate business of the office, and yet it seemed impossible to refuse such requests; and, for a considerable time, such employment was interesting as a matter of scientific inquiry. Especially when we could compare our estimates with the more definite and accurate results obtained by putting specimens or "nuggets" through the regular routine of melting and assay. On one occasion a lump, weighing over 200 gounds, came to us for this purpose. It was sent by the Isthmus route, at a time when transportation was enormously dear, and having visible gold on the surface, was expected to be rich throughout the mass; and, with this expectation, was on the way to London, to make an impression upon the stock market

there. By the aids of a very large steelyard beam and copper kettle, we were enabled to take the specific gravity, but could not make it higher than that of compact quartz. The result seemed so questionable, that we obtained permission to break up the rock, and found that what little gold it contained was at the surface.

Not only were ores brought to us from California, to be estimated, but also from other mining regions, and of various metals; but chiefly gold and silver. As the specimens were of all sizes, these demands upon us often proved embarrassing, since it was necessary to have beams suited to them, and with attachments for weighing in water. We therefore had frequent recourse to the method advised by the elder Dr. Patterson (formerly President of this Society,) which consisted in using a jar or pitcher, rather larger than the specimen, and not over-large at the mouth; this was filled with water up to a marked line; and then, by introducing the specimen, and bringing back the water to the same line, so much water was removed as was just equal in bulk to the bulk of the specimen; the weight of this water gave the divisor, the weight of the specimen (taken while dry,) the dividend, and the quotient was the specific gravity.

The results thus obtained were, generally, as satisfactory as those by the usual method. And here it may be interesting to cite a few examples from our minutes, of specimens estimated by one or other of the processes mentioned, and afterwards melted down and assayed as regular deposits.

1. A lump of quartz, containing gold, found by two Mexicans of the "Sonorian camp," in California, weighed 265½ ounces: assuming the quartz at the sp. gr. of 2·60, the amount of gold appeared by sp. gr. of the lump, to be 209½ ounces; the actual amount was 211⅛ ounces.—2. Another lump, where we assumed the matrix at 2·64, gave an estimate of 100⅛ ounces of gold; the actual product was 100 1-10th ounces.—3. Four pebbles taken together, estimated at 77 ounces; actual content 76 8-10th ounces. And, lastly, a lump which had been bought in California for 800 dollars, and which weighed 408½ ounces, gave an estimate of 89½ ounces, or 1572 dollars, taking the matrix at 2·63; the actual yield was 91 2-10th ounces, or 1602 dollars; the fineness being 850 thousandths. In this case there was an error of

30 dollars, or about two per cent. upon the value; an amount of error to which such specimens are liable, with any apparatus.

But it was obvious that the method of displacement required a series of vessels specially adapted to the operation, to complete with weighing in closeness of results. After a good deal of reflection and experimenting, in which many modifications of shape and arrangement were tried and discarded, and which it would be cumbersome to notice in this place, the apparatus now shown was found to answer best. In practice it is really a pleasant and satisfactory substitute for the tedious and irksome method usually resorted to. Some few precautions must, of course, be attended to. The vessel must stand firmly. If at first the water will not flow, or flows fitfully, the obstruction will be removed by blowing a little in the spout.

An investigation of some interest, growing out of this matter, may properly be noticed. Where we are operating on substances of low specific gravity, say wood or stone, a drop or two of water, or the size of the drop, in tapering off the divisor, is of no consequence. But it is otherwise in the case of a gold coin, for example:—in a double eagle, the difference of one drop of water (ordinary about a half-grain) in the devisor, would affect the result to the extent of 0·3, which carried into the fineness, would make a difference of 15 or 20 thousandths; and in the case of a half-eagle, the uncertainty of result would be proportionally increased. The question then arose, what fluid, or what modification of water, will afford us a smaller drop? for, as was just observed, a half-grain is, on the average, the smallest of clean water that will detach itself by its own weight. Very much depends, of course, upon the size of the aperture, in the measure of drops of fluid; one drop of water from a large beak weighed 1½ grains. In the Dispensatory of Drs. Wood and Bache, there is a table of the experimental results of Mr. Durand, showing the number of drops of different liquids equivalent to a fluidrachm (page 1405.) The differences are very remarkable; distilled water, for instance, being set down at 45 drops, and pure alcohol at 138 drops. And in our own experiments, the drop of alcohol was about one-third the weight of the drop of water, from the same pipette. This seemed to point to alcohol as a substitute;

but there were obvious objections, and a much better vehicle was found in *soapy water*.

The best white soap, sold at the shops, is of the same specific gravity as water, and its mixture with water makes no change, in that respect. When the mixture is as strong as children use for blowing bubbles (we cannot conveniently give this measure in figures,) the cohesion or tenacity of the water is so much weakened that the drop is reduced to one-tenth of a grain. No other fluid makes so small a drop as this. And there is the further advantage, that soapy water, though excellent for making bubbles, is less liable to retain them below the surface than pure water. So small a drop, of course, makes the experiment more tedious, and, by using less soap, the size of the drop will be, in many cases, advantageously increased.*—*Silliman's Journal, Sept.* 1856, *from Proc. Amer. Phil. Soc.*

Varieties.

Observations on the climates of California. By Mr. George Bartlett, (from a letter dated Providence, June 27, 1856.)—The natural forces which produce the various meteorological phenomena of California, are much less numerous than in the eastern part of the continent, and act on a much larger scale, and they are therefore more easily understood. In fact, with a knowledge of three great causes, the peculiarities of the several climates of California would have been readily anticipated. These are; 1st, the cold ocean current which rolls along the coast from northwest to southeast; 2d, the direction of the winds; 3d, that property of air by which its capacity for containing moisture is increased with the elevation of its temperature. The ocean current will no doubt be thoroughly examined in the course of the Coast Survey. Dr. Gibbons, of San Francisco, ascertained at one time its temperature to be 54° Fahrenheit.

Now, during the summer months, as soon as the rays of the sun have warmed the air over the land, it becomes rarified, and the colder and heavier air rushes in under it from the ocean, producing that sea-breeze, which

*[Note.—An apparatus precisely similar in principle, but varied slightly in detail, was described and figured in the Pharmaceutical Journal for May 1856 by Mr. Stevenson. Instead of the open spout, a tube depressed at an angle furnished with a stop cock is used.—Editor Amer. Jour. Pharm.]

lashes the coast of California with so remarkable regularity, almost every afternoon throughout the summer months, driving the sand through the air, and compelling people to put on over-coats and kindle fires, even under that cloudless sky and in those low latitudes. As this cold air from the ocean is warmed by the land, of course its capacity for holding moisture is increased, and instead of there being any tendency to form clouds and to to rain, it becomes a very drying air, absorbing water from everything that it touches. This is the very simple and plain explanation of the dry season.

The most wonderful phenomenon of the California climates, is the marked manner in which they are cut in two by no higher chain of mountains than the Coast Range. This range extends along the coast of California from latitude 34½ to 41½, and is so low, that snow collects during the winter only on a few of the highest peaks. Now, while the western side of this range has the cold summer above described, the valley on the east side is one of the hottest portions of the earth. This valley, through which flow, in opposite directions, the waters of the Sacramento and the San Joaquin, extends about 400 miles from north to south, with an average breadth of perhaps 60 miles, from the Coast Range on the west to the Sierra Nevada on the east. It is a very flat valley, much more level than the western prairies, and occupies the great portion of the interior of California. It has been quite difficult to obtain exposures of a thermometer which were unobjectional. In the cloth tents and stores which were in use in 1849 and '50, the temperature would range in the warm days from 115° to 120°. On the north side of a large tree, also in a wooden cabin covered with earth, a friend of the writer observed the mercury at 110° and 112° during many of the days of 1850. On the north side of a large two-story frame house, with but one other house near, and that one several rods distant, the writer has observed the mercury at 109°. But Dr. Haille at Marysville, by hanging his thermometer in a draft of air in the back part of his office, where it was shaded by high buildings around, succeeded in keeping the mercury down to 102° during the summer of 1852. The sun rises clear in the east, rolls up over the heads of the inhabitants, drying and scorching everything in sight, and sinks in the west—"One unclouded blaze of living light." And this is repeated day after day, and month after month. The hottest time of day is about half-past five in the afternoon. The nights are cool; you need two or three blankets to sleep comfortably even in the hottest part of the summer. A plate of butter set in a common wooden house, will be perfectly liquid at night, and entirely hard in the morning, and these changes will occur every twenty-four hours for months in succession.

The change from the cold climate of the coast to the heat of the valley is marvellous. You go on board a steamboat at San Francisco at four o'clock in the afternoon, and find the passengers all dressed in winter clothing, flannels and overcoats, huddled around the stove in the cabin with its hot anthracite fire. The next morning at sun-rise, you find

yourself going up the Sacramento river, and, as your state-room is insufferably hot, you put on the thinnest summer clothing, and go out on the guards of the boat, oppressed with the heat, and the perspiration starting from your pores.

There seems to be some doubt whether the great difference between the climate of the coast and that of the interior, is to be wholly attributed to the Coast Range. From Benicia this range trends inland, leaving quite a broad tract between it and the sea. On the east side of the bay of San Francisco, between the bay and the mountains, is a tract of level land, five to ten miles in width, of great fertility and which, in the month of May, is almost one unbroken field of waving grain. This plain is swept every afternoon in summer by the sea-breeze, and there is no doubt the breeze here is less violent and less cold than it is in San Francisco, though nothing intervenes but a smooth sheet of water.

This plain may be considered a portion of the valley of San José, which extends southerly from the neighborhood of San Francisco, some 70 or 80 miles, between the broken hills of the coast and the main ridge of the Coast Range. The valley, as well as others similarly situated, among the straggling ridges of the Coast Range, such as Nappa, Santa Cruz, San Pablo, &c., enjoys the most delightful climate in the world. The fierce gale which drives through the streets of San Francisco, is here tempered into a bland and bracing breeze. The malaria, so prevalent in the great valley of the interior, is here unknown. The husbandman reaps the abundant harvests of the fertile soil in *health* and *comfort*. For two months he reaps, leaving the grain in the fields, and for two months more he threshes and winnows, allowing the bags of grain to stand where they are filled, without the slightest apprehension of a shower. No thunder ever disturbs the serenity of the sky. These delicious valleys are indeed the Edens of the west.

Besides these three climates in California, that of the coast, that of the interior, and that of the small valleys which lie among the scattered branches of the Coast Range, there is yet a fourth, the climate of the mountains. But this, with the exception of its dry seasons, has merely the characteristics of other mountain climates, the heat decreasing with the altitude.

These are the summer climates. In the winter there is no perceptible difference in the weather throughout California, except the very small difference caused by the latitude, and the very great difference caused by the altitude. In the lowlands the climate is very similar to April in New England, or perhaps it may be more nearly compared to our spring, from the middle of March to the middle of May. There is no snow, though frosts are frequent. Near San Francisco, peas are planted in October, and strawberries are to be had every day in the year. Still, ice has been known to form half an inch thick in one night. On the mountains, snow falls to a great depth. Indeed, the stories which are told of its depth

are incredible, many persons having assured the writer that it would average ten feet. Nearly all the rains are with the wind from the south, probably caused by the simple cooling of the air in moving from a lower to a higher latitude. Occasionally, about once in a season, there is a rain with the wind from the north. The climate is remarkably serene. There are very few gales or high winds. In the winter it is generally calm. In the summer, in the interior, there is generally a very mild breeze, more than half of the time from the south; and, very unaccountably, the wind from this direction is generally cooler than the wind from the northwest. Probably the reason why there is no thunder and lightning, or so little, is, that there are no showers or clouds in the summer. That the sea breeze, with its accompanying dryness, does not continue through the winter, is probably attributable to the diminished force of the sun's rays in his withdrawal to the south.—*American Journ. of Science and Arts,* Sept., 1856.

On a Cause of Atmospheric Electricity.—There exists between the living plant and the soil supporting it an electric current, which always moves in the same direction, that is, the soil is constantly positive, the plant continually negative. This fact was first observed by M. Becquerel, Sr., and for several years it has been pointed out by him as one of the causes of atmospheric electricity. On repeating the experiments a year since, he was struck with the anomalies presented in operating on the bank of a stream, in the water, and also at a certain distance from the plant, and was thus led to study the effects under these circumstances. These effects are complex and change their direction and intensity with the chemical composition of the water and the soil. In each case the results depend on heterogeneity between the water and the soil; alkaline waters are negative, and acid waters positive; it follows therefore, that sometimes the effects are null, as happens on the waters of a river and along the sandy banks washed by the floods.—*Ibid.*

Fecula of the Horse-chestnut.—Among the products in the Agricultural Exhibition, the different kinds of fecula were of prominent interest, and especially the fecula of the horse-chestnut (Æsculus hippocastanum). The exhibitor of it, M. Callias, has been honored with the silver medal, because of the simple and economical method of extraction which he has brought into use, permitting the fecula to be sold 25 to 30 per cent. less than other related products.

This fecula has been many times commended to attention since Bachelier in 1615 brought the tree from Constantinople, (it coming originally from Southern Asia). Parmentier, Beaumé and others sought successively to bring it into general use. But the mode of manufacture was not satis-

factory, partly because of the presence of a resinous substance which was separated with difficulty, and partly on account of the dark shell of the nut, which it was thought necessary to remove before extracting the fecula.

In the new process, the nuts are grated with the bark on, and treated like the potato with its skin; the material is then washed in water as easily and as economically as the potato, so that the price is not above 20 centimes per kilogramme, the cost of cultivation and manufacture being included. 20,000 kilogrammes of the fecula manufactured this year with the apparatus that is used for the potato have settled the question of its importance.—*Ibid.*

Gura Nut of Africa.—The gura nut is a species of large red bean, of a bitter taste, but greatly prized for its tonic properties. It grows on a tree resembling somewhat the magnolia, and is to be found only along the sea coast regions. The tree bears a large number of pods, in appearance and size not unlike a cucumber. Each of these pods contains a half dozen or more of these irregular-shaped beans. They are greatly prized by the interior nations, and especially by travellers, who have to perform long journeys, and many times without sufficient food.—*The Medical World*, Dec., 1856.

Families of Insects.—A celebrated entomologist says, that more than a lifetime would be necessary to enumerate the various species of insects and describe their appearance. Meiger, a German, collected and described 600 species of flies, which he collected in a distance of ten miles circumference. There have been collected in Europe 20,000 species of insects preying on wheat. In Berlin, two professors are engaged in collecting, observing, and describing insects and their habits, and already they have published five large volumes upon the insects which attack forest trees.—*Ibid.*

Raising Opium in Alabama.—A writer proposes the attempt of raising the large white poppy in that State, and thinks the manufacture of opium would be a profitable enterprise. Children and females could manage a good part of the labor, which is a light and agreeable occupation.

The climate is unquestionably favorable to a strong growth. Vast fields of poppies are grown in Belgium and some parts of France, not for the opium, however, but for the oil, extracted from the seed, which is used with white lead or zinc, for producing a beautiful white paint that does not turn yellow, like linseed oil exposed to light.

Just at sundown, those having care of the opium poppies, make several slight cuts lengthwise on the seed bulb, before they become ripe. A milky juice immediately exudes, which thickens in the sun next morning, and is

then scraped off. This product is pure opium. Any one of the Southern States in which cotton is grown, might produce an opium crop, annually, for exportation, that would yield an immense revenue.—*Ibid.*

Exploration of the Nile.—The new expedition to the head waters of the Nile, under the command of the French Count d'Escayrac de Lauture, and under the protection and auspices of Said Pasha, promises to exceed all other similar projects hitherto set on foot. At Vienna, twelve officers of the Austrian general staff expressed their willingness to join the expedition, from which number three were selected, who, together with the mineralogist, Mayer, recently in the service of the Dutch government in Borneo, make up the complement of Germans in the expedition. The whole force will comprise twelve Europeans, besides the leader, and three hundred soldiers furnished by the Egyptian government. Among these latter, who are principally natives of the interior of Africa, there is supposed to be a sufficiency of interpreters. For the navigation of the Nile, the expedition has thirty barks and two small steamers, and one hundred men, besides the necessary men and means to continue the journey by and beyond the head of navigation. Never before was an expedition fitted out in like manner.

Much is expected from the medical gentlemen in the expedition. They were to have left Europe on the 10th of September,—and it is therefore presumed they are on the way—Count d'Escayrac with the Germans embarking at Trieste, and the French expeditionists at Marseilles. The entire party will meet at Alexandria, and expect to reach Chartoum by December, where they will remain some time to complete the organization.—*Ibid,* Oct., 1856.

Bookworms.—In paper, leather, and parchment, are found various animals, popularly known as "bookworms." The larvæ of *Crambus pinguinalis* will establish themselves upon the binding of a book, and, spinning a robe, will do it little injury. A mite (*Acarus eruditus*) eats the paste that fastens the paper over the edges of the binding, and so loosens it. The caterpillar of another little moth takes its station in damp old books, between the leaves, and there commits great ravages. The little boring wood beetle also attacks books, and will even bore through several volumes. An instance is mentioned of 27 folio volumes being perforated, in a straight line, by the same insect, in such a manner that, by passing a cord through the perfect round hole made by it, the 27 volumes could be raised at once. The wood beetle also destroys prints and drawings, whether framed or kept in a portfolio. The "death watch" is likewise accused of being a depredator of books. These details were collected by the experienced keeper of the Ashmolean Museum at Oxford, in 1841.—*Ibid.*

Scientific Merit.—The Copley Medal, of the past year, has been awarded to Prof. Milne Edwards, of Paris, for his brilliant researches in comparative anatomy and zoology. Another to Prof. W. Thomson, of Glasgow, Scotland, for his various physical researches relating to electricity, in reference to the motive power of heat. Prof. Louis Pasteur, of Lille, had the Rumford medal for his discovery of the nature of *racemic* acid and its relation to polarized light.—*Ibid.*, Jan., 1857.

Safety Lucifer Matches.—The safety lucifer match is the invention of Lundstrom, a Swede, who has a large match manufactory at Jonkoping, in Sweden, where some hundred workmen are employed, and eight or more millions of matches are produced daily. They are about to be introduced into this country by the firm of Bryant & May, London, who are the largest importers of German and Swedish lucifers in the kingdom. A patent has been taken out in their name for the sale in England of the Swedishmatch. Its peculiarity consists in the division of the combustible ingredients of the lucifer between the match and the friction paper. In the ordinary lucifer, the phosphorus, the sulphur, and chlorate of potash or nitre, are all together on the match, which ignites when rubbed against any rough surface. In the Swedish matches these materials are so divided that the phosphorus (which is employed solely in the amorphous state,) is placed on the sand-paper, whilst the sulphur, and a minimum amount of chlorate or nitrate of potash, is placed on the match. In virtue of this arrangement, it is only when the phosphorized sand-paper and the sulphurized match come in contact with each other that the ignition occurs. Neither match nor sand-paper, singly, takes fire by moderate friction against a rough surface. The matches are thus much less liable to cause accident by casual ignition than the ordinary ones; and the recent edict by the Spanish Government against the employment of lucifers by the peasantry of the forest districts in dry weather (which will certainly be evaded) would be needless, if the Swedish matches were in general use. If they fully answer the announcements of the inventor, and it is due to him to acknowledge that they excited great interest at the exibition in Paris last summer, they will soon displace the common lucifer, in virtue alike of their manufacture being much less injurious to the health of the workmen who make them, and to the property of those who use them.—*Journ. Franklin Institute*, Jan., 1857, from *The Lond. Journ. of the Society of Arts*, No. 194.

An Ice Machine has been completed at Cleveland, Ohio, which is capable of producing one ton of solid crystal ice in twenty hours. A trial has recently been made with the above result, while the mercury stood at 80° in the appartment. The estimated expense of manufacturing ice by such a machine is $5 per ton, or one-fourth of a cent per pound.—*The Medical World.*

For the Hair.

Castor oil	2½ lbs.
Strongest alcohol . . .	2½ pints.
Pulv. cantharides . . .	½ oz.
Oil bergamot	2½ oz.
Otto of roses	20 gtt.

M. Let them stand for a few days and filter.

Superior for keeping the hair from falling, and preventing dandruff.—*Druggist's Circular.*

Artificial Meerschaum. By L. WAGENMANN.—If carbonate of magnesia be mixed with an eighth of its weight of calcined magnesia, and a little paste of lime obtained from calcined marble and solution of soluble glass added to it, the mass, after complete drying, is not unlike meerschaum, and may find employment in the arts. The alkaline salt produced is extracted by water from the dry meerschaum, which is then boiled with wax. —*Lond. Chem. Gaz., from Journ. für Prakt. Chem., lxvii. p.* 502.

Purification of Commercial Oleic Acid. By G. W. F.—Oleic Acid, which is procured in the manufacture of Spermaceti, &c., has lately come into use as a medicinal agent, on account of its power of dissolving other substances, used for external purposes; but as we find it in commerce it is not pure enough, containing in particular a surplus of sulphuric acid. To purify this commercial Oleic Acid, we dissolve it in as large a quantity of cold rectified alcohol, as it will absorb, and allow the solution to stand quietly for several days, during which a tallow-like substance is deposited. This is immersed in a large quantity of clean water; the particles of oil, which float on the diluted alcohol, are removed, and the whole again well shaken after a little more water has been added. Now filter the whole through white paper.

The alcohol may be purified again by agitating with charcoal or by distillation.—*Druggists' Circular.*

Fragrant Tincture of Myrrh for the Teeth and Gums.

Displace 1 lb. powdered orris root, with 5 galls. best alcohol, add 2¼ lbs. small light colored tears of myrrh, bruised *in a Wedgewood mortar.* Let them stand a week, shaking often, then pour off clear, and add

Otto roses . . .	½ oz.
Oil bergamot . . .	1 oz.
Oil cassia . . .	½ drachm.
Oil cloves . . .	10 gtt. And filter.

Age improves it very much.—*Ibid.*

Deodorizing Tanks.—The Town Council of Glasgow have recently constructed some tanks for purifying water, and a chemist has since been appointed to advise the sanitary committee in making the necessary experiments. The council have now three tanks, 60 feet in diameter and six deep, with a mixing well 10 feet in diameter, an engine of eight-horse power, and a pump capable of raising 1,000 gallons in a minute, the calculation being that these tanks are quite capable of purifying the whole of the Pinkston Burn. The cost is £750, but that includes £195, for which sum the contractors have engaged to work the engine for three months, or £250 if for six months. At Mr. Wickstead's works in the neighborhood of Leicester, the deoderant used is lime, the process precipitation. It is thus described:—The whole of the sewage mater, including the refuse from dyers and scourers, is brought by the main sewers of the town to the works at the outfall, and in its passage to the reservoir the proper proportion of cream of lime is pumped into the pipe through which the sewage water passes. It is then passed through agitators before entrance into the reservoir, and when admitted, the solid matter begins to precipitate immediately, while the sewage water, thus gradually freed from impurities, flows into the river in a disinfected state at the further end of the reservoir. From the beginning to the end of the works no unpleasant smell whatever was perceivable, although the subsiding tanks, and all the processes mentioned are in the covered part of the buildings. The deoderization is complete.—*Ibid.*

Acetic Acid in Emulsions with Borax. Translated by Geo. W. Fenner.—It is a well known fact, that when Borax is added to a mucilage, it soon thickens, so that, if the quantity of Borax be large, a compact mass even is formed. Such mucilages and emulsions with borax being frequently prescribed by physicians, Dr. Geisler has made a long series of experiments to overcome this difficulty, and, according to the Archives of Pharmacy, vol. 87, p. 196, has at length completely succeeded. He puts into the liquid with which the emulsion, &c., is made, a few drops of diluted acetic acid, adding the pulverized borax after the emulsion is formed. This is a perfect remedy for the difficulty complained of.—*Druggist's Circular.*

Testing of Woollen Tissues for intermixed Cotton. By Dr. A. Overbeck.—The tissue is laid in a solution of 1 part of alloxantine in 10 parts of water, pressed and dried. This process is repeated twice. It is then exposed to dry vapors of ammonia, and washed with distilled water. The woolly fibres are now permanently dyed crimson; the cotton fibres remain colorless.—*Chem. Gaz., from Archiv der Pharm.*

Editorial Department.

FATAL CASES OF POISONING; PHARMACEUTICAL CARELESSNESS.—Within the last two or three years the deaths by poisoning, accidental and designed have been unusually numerous. Hardly a Medical or Pharmaceutical journa comes to hand, but presents some account of such catastrophes. These cases may be divided into three classes;—1st, *accidental* poisoning; 2d, intentional *suicidal* poisoning; 3d, and intentional *murderous* poisoning. Of the latter class the celebrated case of PALMER in England, who victimized friends and relations for lucre merely, is one of the most extraordinary. Domestic troubles, taking their origin in ill-assorted marriages, are a fruitful source of both murderous and suicidal poisoning;—and occasionally revenge for real or fancied wrong has resorted to poison as the agent for its gratification. In cases of this character, pharmaceutists are rarely implicated, further than is occasioned by the laxity of law and custom in reference to the sale of poisons, which under plea of use for vermin may be obtained with comparative readiness. But a few days since, the papers recorded an instance where a man poisoned himself and family by putting a shilling's worth of arsenic in the morning coffee, resulting in the death of three. Poison bought for vermin is carelessly left in a position where it gets accidentally admixed in food, death ensues, and occasions but a passing remark from the editor who records the occurrence. When, however, through the agency of an apothecary, poisoning ensues, that *public opinion*, so lenient in the former case, rises up in judgment upon the delinquent, and sometimes consigns him to the prison, as has occurred recently in England. Why is this? Because the community repose confidence in the apothecary as a conservator of the public health, and expect him to possess those qualifications, natural and educational, requisite to carry out the important duties of his profession.

Pharmaceutists are, however, made of the same materials as other men—the same deficiencies of education—the same variations of the intellectual and moral faculties. Nature makes no special class designed to fulfil the onerous and responsible duties of pharmacy with unerring certainty. In order that posterity may have those duties performed, it is necessary that *boys*, (and girls too, if these are to be employed as pharmaceutical assistants) in this generation, should be taught them, and to be able to learn, they must be afforded the opportunity to practice at the counter. But it should be under the *surveillance of qualified persons*. To expect more than this in the present unprotected condition of pharmacy is like expecting people to be expert swimmers before they go in the water! Some cannot learn to swim even with the latter privilege, and so some men can never become expert and reliable pharmaceutists, owing to natural deficiencies and want

of early training. Yet such imperfect members of the profession, however much they may have mistaken their calling, must live by the pestle and mortar, and from time to time they break in on the monotony of their existence by an error of ignorance or negligence that wakes up the public mind to a state of nervous timidity and renders every disciple of GALEN an object of undefined suspicion. The public sentiment, however, soon relapses again into indifference and forgetfulness, without resorting to any wise precautionary legislation, calculated to give a proper status to the pharmaceutist, based on an adequate legal protection of the practice of pharmacy from unprincipled competition, and requiring that all who dispense medicines shall be properly prepared for it by a special practical and theoretical education.

These remarks have been called forth by recent occurences in this city and Baltimore, which resulted in the death of three individuals, and in reference to which some comment seems called for in this journal, to point a caution to its readers.

About the beginning of Januarv, 1857, an English lady called at the counter of a prominent pharmaceutist in Philadelphia, and asked the proprietor if he could furnish some "black draught," a solution of senna, salts, etc., better known in England than the U. States. She was told that it could be prepared for her and sent, which was accordingly done. A few days afterwards, needing more of the medicine, she sent her son to get a blue pill, some tamarinds, and to have the "draught" renewed, presenting the labelled vial in which the first draught had been contained. A female assistant in the store received the order, put into the vial an ounce of *Black Drop*, and, without changing the label, or signifying to the messenger its poisonous nature, sent it away. The vial was subseqently placed by the bedside of the lady, for whom it was procured, that she might take it early in the morning.

Some time after the family had arisen, attention was attracted to the lady by her stertorous breathing. The vial was examined and found emptied, it was returned to the apothecary, to query if it was correct, and was pronounced all right. The physician of the family being sent for diagnosed cerebral congestion from apoplexy, or a narcotic poison. The message from the apothecary contradicted the latter idea, and before any efficient measures were taken, the patient succumbed. On subsequently again applying to the apothecary he found that an error had been made.*

The immediate cause of error in this instance was either carelessness from want of proper training, or it was gross ignorance. If it be admited that the assistant understood the messenger to say "Black Drop," which is very probable, especially as the price charged indicated it, then why did she

* Since the above was in print, we learn from the "Public Ledger" of Feb. 24th, 1857, that the Coroner's jnry has rendered a verdict in accordance with the above facts.

not label the vial, knowing it to be a deleterious preparation, and one that should never be sold without the assurance of correctness, unless ordered by prescription. The most charitable view is, that the messenger was understood to say "Black Drop," and that the label, by a hasty glance, was read "Black Drop," (when it was "Black Draught,") and was so dispensed. If this view is abandoned, and the occurrence attributed to ignorance in identifying the shop bottle, why was the high price of black drop charged for the preparation of senna intended? Such errors are liable to occur in any store where a part of the duties are executed by beginners, unless the all-important maxims for regulating extemporaneous pharmacy are early and constantly instilled into the apprentice during his novitiate, until they become by habit a second nature. Until this period arrives, the qualified assistant or proprietor cannot be too constantly watchful over the transactions of the junior. Some of these maxims are the following:

1st. Never permit any medicine to leave the shop without an appropriate label. (Had the vial been sent properly labelled with the direction for use that always accompanies it, there are nine chances to one that its nature would have been detected in time to have prevented the catastrophe.)

2d. Cultivate a habit of close attention when receiving a message, and understand it clearly, before giving ear to a second applicant.

3d. Never dispense any active or poisonous medicine, whether by prescription or otherwise, without recurring mentally to the question, "*Is it right?*"

4th. When a written order is not presented, it should be a uniform custom to get the demand repeated by putting a question, thus: "Did you say an ounce of *Black Drop?*" or, "*Laudanum* did you say?" or, "What did you ask for?" In this way, by giving very little trouble to the customer, the apothecary may have a check on error which will rarely fail, and which by long practice, we can recommend as a simple and safe expedient. There are names which, though spelled differently, have an analogy in sound, and the case in question is an instance of this, where the "a" in the last word is accented as the "a" in "awful" or "haul." We have repeatedly noticed instances of this kind.

5th. There is another precaution which may be adopted in every store with advantage; it is the German custom of putting the sign †, under or above the label of every poisonous substance; a black cross for mineral poisons, and a red one for vegetable or organic poisons. This sign has the force of a suggestive check to the apothecary himself, whilst the customer has no such impression created as would be caused by the word "Poison" on a bottle out of which his medicine was being taken. Besides, if the beginner is at once told the meaning of the sign, it will be a caution he can understand without further teaching, that will lead him to be careful whenever he handles bottles so marked.

Lastly. We may appropriately here repeat the often reiterated suggestion that in dispensing medicines from shop bottles, the apothecary should

compel himself to a habit of looking at each label before taking the medicine from it. In this way grave errors are constantly avoided in prescriptions where similar looking substances, like tartar-emetic and saltpetre, are being introduced, the one by grains and the other by drachms, by preventing the substitution of one for the other.

The second case of poisoning, in Baltimore, was of a different character, and appears to have been the result of carelessness in labelling a shop bottle containing granulated cyanide of potassium with the label *Kali Chlor:* which may mean Chlorate of Potassa, or Chloride of Potassium. The following report of a committee of the Maryland College of Pharmacy in reference to this case, will explain it to the reader.

"The Recent Fatal Case of Poisoning.—At a late meeting of the Board of Trustees of the Maryland College of Pharmacy, a committee was appointed to investigate the circumstance attending the fatal mistake recently made by an apothecary of this city, and directed to make a report to the College at its next meeting. A special meeting of the College was held on the 30th inst., when the committee made the following report: The committee appointed to investigate and report upon the late lamentable cases of poisoning in this city from the use of Cyanide of Potassium, respectfully submit the following, viz:

That they have given the subject a thorough examination, and after comparing all the facts obtained from the physicians, coroner and others, as well as from their own observations, have come to the conclusion that the apothecary alone was responsible for the mistake, but are unable to account how any one with the proper qualifications of a Pharmaceutist could have made so fatal an error.

We found the bottle, the contents of which it is supposed were taken to compound the prescription, to have upon it two written labels, one pasted over the other. The under one was indistinct, but appears to have originally been Kali Chlor, afterwards altered by writing over it Kali Cyanid, the term generally used by German pharmaceutists for Cyanide of Potassium. The outer label was in the hand writing of the deceased, Chloride of Potassium, but the salt remaining in the bottle bears unmistakeable evidence of being granulated Cyanide of Potassium, one of the most deadly poisons known in Pharmacy.

The prescription of Dr. Arnold, plainly written, is as follows:

Potass. Chlor., 2 scruples.
Mel Scillæ, } each 4 drachms.
Syr. Lemon, }
Aqua Anis. dil. 1½ ounces.

The original prescription, the phial containing part of the medicine compounded by the apothecary, and the bottle containing a portion of Cyanide of Potassium, are now in the possession of the Maryland College of Pharmacy.

Geo. W. Andrews,
A. P. Sharp,
L. Phillips,
Committee.

Baltimore, Jan. 30, 1857.

After the adoption of the above report, Mr. I. J. Graham offered the following resolution, which was concurred in:

Resolved, That although we regret deeply the occurrence by which either through ignorance or carelessness, or both combined, there was administered to the child of a citizen, an active poisonous compound in the place of a comparatively inert preparation, resulting fatally both to the child and the druggist who compounded the mixture; we feel it incumbent on us to make known to the public that the agent through whom this direful result was brought about, was in no manner connected with the Maryland College of Pharmacy."

From the newspaper accounts of the occurrence it appears that after the

death of the child for whom the mixture was prescribed, the bottle was taken to the apothecary with the information, when he immediately swallowed some of it, to show his confidence in its correctness, from which dose death ensued. The deceased appears to have been but little known and not long in possession of the store in which the mistake was made. What his claims really were to pharmaceutical education are not known; but from the books found in his possession it might be inferred that he was not uneducated.

It is highly probable that he found the bottle mislabelled when he came into possession of the store, and as Chlorate of Potassa or Chloride of Potassium are neither of them much called for, he may never before have had occasion to use the fatal bottle. Chloride of Potassium is frequently seen in a form closely resembling granulated Cyanide of Potassium, but *Chlorate* of Potassa is always in crystals, and as that was most probably the salt intended, it shows the importance of physicians being more explicit in prescription writing. It is possible that in this instance that the result might have been different had the name been written "℞ *Potassæ Chloratis* ℈ij"; but be that as it may, the occurrence points to the danger of trusting to mere labels, without a corresponding knowledge of the substance labelled, and especially to the necessity of great caution regarding the contents of bottles in purchasing second hand stores.

Iodine water.—The propietors of a preparation with this name have sent us a bottle. They claim it to be a solution of pure iodine in water *without any solvent* (!) to the extent of from one-half to three-quarters of a grain per fluid ounce. Dr. Chilton certifies to the solution containing about half a grain to the fluid ounce. A fluid ounce of the specimen sent to us, however, when treated with pure liquor potassæ, *diluted* to hundredths, was found to be decolorized and rendered insensible to starch paper by .06 grain of potassa, which is equivalent to less than one-sixth of a grain of iodine; but as the specimen tried had been kept some time in a warm room it may have lost strength. Admitting the presence of the amount of iodine averred, it is most probably held in solution by traces of hydriodic acid, and not by *pure* water. It is not, however, with the strength of the solution we have to do, so much as with the presumption and effrontery which in view of its actual composition could induce the proprietors to assert that "Anda's Liquid Iodine *has demonstrated itself to be a complete and certain cure for consumption, palsy, rheumatism, scrofula, liver complaints, heart diseases, and disorders arising from impurities of the blood.* It always effects a cure," &c., (Druggists' Circular, page 16). The absurdity of supposing that this solution has more merit than Lugol's solution, equally diluted, is too marked to deceive any but the unprofessional, at the same time there *may* be a decided advantage in administering iodine in this very dilute form, patients often being very careless in the preparation of the ordinary tinctures or solutions preparatory to swallowing them, as regards proper dilution.

Whilst on this subject we will remark that physicians occasionally, by the careless association of acid substances with iodide of potassium give their patients unintentionally iodine in a free state. This is often done by prescribing sweet spirit of nitre with iodide of potassium. It is true that this spirit *ought* to be free from acid, but where it is neutral in one instance, it is acid in twenty, to a greater or less degree, and it is only when kept standing on some antacid salt like crystals of bicarbonate of potassa, as suggested by Mr. Harvey, (see U. S. Disp.) that it is always in a state fit for this use. Pharmaceutists will find it convenient to adopt this method of keeping a portion of sweet spirit of nitre in a neutral state as, however free from acid the preparation may be when made, it tends to eliminate free acid in the frequently opened shop bottle. When this free acid is acetic, derived from the oxidation of aldehyde, the change in the iodide of potassium is not at first perceptible; it merely produces acetate of potassa and hydriodic acid; but gradually this acid, in contact with the air, is decomposed with the formation of water and free iodine. When the acidity of the spirit is due to either of the nitrogen acids, there is an instantaneous development of free iodine.

The American Druggists' Circular and Chemical Gazzette.—Two numbers of this monthly periodical have reached us. It is published by Bridgman & Co., Druggists, New York, and edited by Henry Bridgman. Each regular number consist of a sheet in eight pages, four columns each, in a type neat and comprehensive.

The "Druggists' Circular" claims to be "A practical Journal of chemistry as applied to pharmacy, arts and sciences, and general business organ for druggists, chemists, and apothecaries." Its general aspect is that of a newspaper uncommonly well printed. The proprietors address it specially to business men, and believe that it will prove a valuable medium for gaining and communicating information, and particularly for advertisements. What the tone of this Journal is to be cannot, perhaps, yet be determined, but we trust that it will be an advocate of correct practice, sustain the Drug Law, and oppose the torrent of quackery, professional and popular, which is now so rife.

Researches on the Ammonia-cobalt Bases. By Wolcott Gibbs and Frederick Aug. Genth. Washington City: published by the Smithsonian Institute, Dec., 1856, pp. 67. Quarto. (From Dr. Genth.)

The complex and interesting researches of Prof. Gibbs and Dr. Genth have been fittingly presented to the scientific world, under the auspices of the Smithsonian Institute. The true nature of the changes which ammonia cobaltic salts undergo by the action of oxygen, was not understood until Dr. Genth commenced his investigation in 1847, and published his first memoir in 1851 when in Germany. Since that time they have attracted

the attention of several chemists, and among others Prof. Gibbs, who in 1852 discovered a new class of these salts. As some of the discoveries of Dr. Genth have been described by Fremy as his own, two years after their announcement, it is presumable that this valuable monograph will place Dr. Genth's claims in the right light. We observe that the crystalo-metric determinations are by Prof. Dana of Yale College.

Nouveau Procédé de Dosage de l'Acide Carbonique dans les eaux Minerales suive de Considerations sur la Constitution des eaux de Vichy. Par M. Henri Buignet. Paris, 1856. Pp. 14. (From the author.)

This process of M. Buignet, late Secretary to the Society of Pharmacy, was read to the Académie Imperiale de Médicine, Sept. 9th, 1856, and is based on the fact that gaseous mineral water placed in a barometric vaccuum gives out its gaseous contents, the amount of which is ascertained by the depression of the mercury, corrected for pressure, temperature, etc.

The utility of Colleges of Pharmacy: An Introductory Lecture. By Dr. Lewis H. Steiner, Prof. of Chemistry in the Maryland College of Pharmacy.

We have been gratified by the perusal of Dr. Steiner's lecture, as published in the American Medical Monthly for February. Space will not admit, or we could present our readers with some of the arguments brought forward to prove how Colleges of Pharmacy "can be useful and protective to the apothecary, the medical profession, and the community at large," but we cannot withhold the following paragraph addressed to the student himself:

"We can thus sum up the utility of the college as consisting in the presentation of the surest and swiftest method of gaining a knowledge of Pharmacy, in clothing this knowledge in an attractive form,—bringing out the most important points for the student's notice,—and in giving him a connected view of the relations of the whole subject, which require his attention. If the instructors in such an institution are enthusiastic in their vocation, honest and true to their duties, all these ends will be obtained. But besides these, who does not know the value of system in study, and of the assignment of a certain hour to certain duties; and still more the importance of bringing those together who are prosecuting similar investigations, and causing mind to brighten by collision with fellow mind? This itself is of no small benefit. The youth feels the stimulus of laudable ambition, and enters with a generous and honorable rivalry into the field with his brethren. He lags not by the wayside, for he does not want to be recognized as inferior in abilities and diligence to his companions. Thus mutual emulation acts as the spur to the indolent, and a noble impulse to the industrious. If engaged in private study in the shop, he may easily be persuaded to relinquish his task for some other attraction, and no one will readily detect his negligence; but if this is done here, the contrast is seen at once and odium rests upon him for it,—not only for the present but odium of that character which requires years utterly to eradicate."

The publication of this lecture in a Medical Journal where it will meet the eyes of physicians will add much to its usefulness.